



July 18, 2011

Mr. David Breen
Port of Portland
7200 NE Airport Way
Portland, Oregon 97218

Re: Stock Pile Sampling Results
Port of Portland Terminal 4 Slip 1
Portland, Oregon
1862-00

Dear Mr. Breen:

This letter describes the results of soil sampling activities performed to characterize two stock piles (Western Pile and Pier 2 Pile) located at the Port of Portland (Port) Terminal 4 Slip 1 (the Facility; Figures 1 and 2). Characterization activities were conducted to assist the Port in evaluating potential soil re-use options. Characterization activities included collecting twenty soil samples from test pits that were excavated prior to sampling.

BACKGROUND

Historical development projects at Terminal 4 (T4) generated approximately 30,000 cubic yards of soil which was stockpiled at Terminal 4 northeast of Slip 1. The historical stock pile area encompassed an area of approximately 150 by 500 feet and was composed of two smaller and contiguous (former) eastern and (current) western piles (Western Pile). The former eastern pile was the larger of the two and extended to a height of approximately 30 feet. Soil in the former eastern pile was mostly from historical excavation of the T4 Auto Storage Area (ASA) riverbank to improve slope stability and greenscape. Soil in the Western Pile was subsequently emplaced during development of the T4 ASA facility buildings and utilities. Before material was excavated for the development, an asphalt-concrete surface was removed using a grinder. Some of the asphaltic material is currently present on the surface of the Western Pile.

The piles were sampled in November 2006 because historical analytical data from the excavated area (prior to excavation) suggested the potential presence of total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs). Both piles were randomly sampled using a grid-cell approach. Samples were collected at the designated locations from a depth of 1 to 2 feet. Table 1 lists the data from the 2006 sampling. In the former eastern pile (riverbank soil), diesel- and oil-range TPH were not detected; however, PAHs were detected in three of the five samples. In the Western Pile (facility soil), diesel-range TPH was not detected; however, oil-range TPH was detected in four of the five samples. Additionally, concentrations of PAHs were detected in all five samples collected from the Western Pile.

The results of the sampling in 2006 indicated that the eastern pile could be used as clean fill, but the Western Pile may need to be managed in accordance with the forthcoming media management plan.

Since 2006, most of the former eastern pile has been removed from the area and used as fill for T4 development projects. Based on a survey conducted by the Port in May 2011, the remaining Western Pile contains just over 6,000 cubic yards of soil. Subsequently, excess soil generated during completion of the Pier 2 rail yard project was stockpiled on the remnants of the former eastern soil pile. This new soil was emplaced as two soil piles on the north and south sides of the footprint of the former eastern pile. The north and south piles contain 1,580 cubic yards and 3,110 cubic yards of soil, respectively.

STOCK PILE CHARACTERIZATION ACTIVITIES

On June 3, 2011, Ash Creek Associates (Ash Creek) field staff met with personnel from the Port of Portland Marine Facility Maintenance department, who excavated twenty test pits to depths ranging from 3.5 to 4 feet below the surface of the stock piles. Test pits were completed in general accordance with Ash Creek Standard Operating Procedure (SOP) 2.3 (Attachment A). After completion of the pits, Ash Creek staff collected one soil sample from each pit at depths ranging from 4 to 4.5 feet below the surface of the piles. Each sample was field screened in accordance with Ash Creek SOP 2.1 (Attachment A) for volatile organic compounds (VOCs) using a photoionization detector (PID) and for the presence of petroleum hydrocarbons by sheen testing. Test pit and sample locations were determined prior to field activities by: (1) dividing the piles into a grid with each cell representing an approximately equal volume of soil; and (2) randomly selecting 10 cells in the Western Pile and 10 cells in the Pier 2 piles to be sampled. Ten samples were collected from the Western Pile, and ten samples were collected from Pier 2 Pile. Soil cuttings were returned to respective locations after sampling. Test pit and sample locations are shown on Figure 3. Photographs of the field activities are included in Attachment B.

Soil in the Western Pile is primarily comprised of silt, fine- to medium-grained sand, and gravel. Limited amounts of Portland cement concrete and metal debris were observed on the surface of the pile. Additionally, small amounts of weathered asphaltic-concrete material were observed in near surface soil, and a small amount of asphalt-concrete material was found at approximately 4-feet below the top of surface near two locations in the Western Pile (W-1(4.5) and W-6(4.5)). Visible asphalt-concrete materials were not included in the samples. No field indications of VOCs or petroleum hydrocarbons were observed.

The Pier 2 pile is primarily comprised of medium-grained sand with some gravel. Asphalt-concrete ranging in size from 0.5 to 2 feet in diameter was observed on the surface of the pile. Asphalt-concrete was not observed below the surface of the Pier 2 Pile. No field indications of VOCs or petroleum hydrocarbons were observed.

ANALYTICAL RESULTS

Soil samples were submitted to Pace Analytical Inc. (Pace) in Seattle, Washington, for chemical analysis. Samples were analyzed on a standard turnaround time. Copies of the laboratory reports are included in Attachment C.

Samples were analyzed for diesel- and oil-range TPH and PAHs. Two samples from the Western Pile (W-5(4.5) and W-7(4.5)), and one sample from the Pier 2 Pile (P2-N-4(4.5)) contained benzo(a)pyrene concentrations above the Oregon Department of Environmental Quality (DEQ) Risk Based Concentration (RBC) for direct contact under an occupational scenario (270 µg/kg; Table 2). No other individual samples contained TPH or PAH concentrations above the applicable RBC.

Reasonable maximum exposure (RME) concentrations were estimated using the Environmental Protection Agency's (EPA's) ProUCL program using a 90% upper confidence level (UCL). Calculation of RME concentrations in the Western Pile incorporated historical analytical data from 2006, in addition to data obtained recently. RME



concentrations of benzo(a)pyrene in both the Western Pile and Pier 2 Pile were above the applicable RBC. RME concentrations are shown in Tables 3 and 4. The ProUCL output documents are included in Attachment D.

A quality assurance review of the data indicated that the matrix spike recovery and the relative percent difference (RPD) in the matrix spike/matrix spike duplicate (MS/MSD) slightly exceeded laboratory control limits for several PAHs. The data was reviewed by the project manager and determined to be acceptable.

SUMMARY AND CONCLUSIONS

The Port requested soil characterization of the Western Pile and the Pier 2 Pile. The presence of asphaltic-concrete within the Western Pile was confirmed during test pitting. Asphalt-concrete was also observed on the surface of but not within the Pier 2 Pile. The PAHs detected in the chemical analyses are likely due to the asphalt materials entrained in the soil. A total of 20 soil samples were collected from depths of 4 to 4.5 feet below the surface of the stock piles – 10 samples were collected from the Western Pile, and 10 from the Pier 2 Pile. RME concentrations of TPH and PAH calculated using a 90% UCL indicate that the benzo(a)pyrene concentrations exceed the applicable occupational RBC for direct contact. The Port is evaluating options for reuse of this material on-site in accordance with the ongoing management of the cleanup at the Facility.

If you have any questions regarding these activities, please contact the undersigned at (503) 924-4704.

Sincerely,



Christopher J. Sheridan, R.G.
Project Geologist

A handwritten signature in blue ink, appearing to read "Michael Pickering, R.G."

Michael Pickering, R.G.
Associate Hydrogeologist

ATTACHMENTS

- Table 1 – Analytical Results – Western Pile, 2006
- Table 2 – Analytical Results – TPH and PAHs
- Table 3 – Mean Concentrations (90% UCL) – Western Pile
- Table 4 – Mean Concentrations (90% UCL) – Pier 2 Pile

- Figure 1 – Facility Location Map
- Figure 2 – Site Vicinity Plan
- Figure 3 – Soil Sampling Locations
- Attachment A – SOPs 2.1 and 2.3
- Attachment B – Photograph Log
- Attachment C – Analytical Laboratory Reports
- Attachment D – ProUCL Results



Table 1
 Analytical Results - Western Pile, 2006
 Terminal 4 Soil Stockpile
 Portland, Oregon

	Sample ID	Date Sampled	TPH		PAHs															
			TPH-d	TPH-o	Aceanthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benz(a)pyrene	Benz(b)fluoranthene	Benz(g,h)perylene	Benz(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
					(mg/kg)		(μ g/kg)													
Western Pile	Pile A-32	11/29/2006	<15.1	65.3	<159	<159	<159	194	179	173	<159	<159	334	<159	908	<159	<159	<159	<159	955
	Pile A-37	11/29/2006	<14.6	116	<773	<773	<773	934	1,290	<773	911	869	1290	<773	1,660	<773	<773	<773	<773	2200
	Pile A-60	11/29/2006	<113	640	<72.4	<72.4	<72.4	<72.4	145	115	158	89.8	114	<72.4	<72.4	95.8	<72.4	<72.4	<72.4	46.7
	Pile A-64	11/29/2006	<14.1	<28.1	<29.6	<29.6	<29.6	<29.6	69.3	44.9	97.9	46.8	44.4	<29.6	<29.6	62.9	<29.6	<29.6	<29.6	32.1
	Pile A-79	11/29/2006	<14.8	115	<62.2	<62.2	<62.2	<62.2	124	81.2	128	84.3	92.9	<62.2	71.5	<62.2	86.5	<62.2	<62.2	101
<i>DEQ RBCs</i>																				
Soil Ingestion, Dermal Contact, and Inhalation Occupational			7.0E+04	>Max	6.1E+07	--	>Max	2.7E+03	270	2.7E+03	--	2.7E+04	2.7E+05	270	2.9E+07	4.1E+07	2.7E+03	2.3E+04	--	2.1E+07

Notes:

1. TPH = Total petroleum hydrocarbons by Northwest Method NW TPH-Dx.
2. mg/kg = milligram per kilogram (ppm).
3. PAHs = Polycyclic aromatic hydrocarbons by EPA Method 8270SIM.
4. μ g/kg = microgram per kilogram (ppb).
5. U = Not detected above the indicated method reporting limit.
6. Highlighted values exceed the Oregon Department of Environmental Quality (DEQ) Risk-Based Concentration (RBC) for direct contact in an Occupational Scenario.
7. DEQ RBCs from: Oregon Department of Environmental Quality's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*. September 22, 2003 (RBC Spreadsheet)

updated September 15, 2009.

Table 2
Analytical Results - TPH and PAHs
T4S1 Stock Pile Sampling
Portland, Oregon

	Sample ID	Date	Depth	TPH		PAHs																	
				TPH-d	TPH-o	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benz(o)pyrene	Benz(b)fluoranthene	Benz(g,h,i)perylene	Benz(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
				(feet bgs)	(mg/kg)	($\mu\text{g}/\text{kg}$)																	
Western Pile	W-1(4.5)	6/3/2011	4.5	58.4	582	13.8	28.9	19	25.3	15.8	72.4	133	108	103	55.5	92.5	16.5	80.2	12.2	73.8	76.5	68.3	106
	W-2(4.5)	6/3/2011	4.5	<16.5	<65.8	13.9	18.5	<7.2	<7.2	17.5	58.5	86.4	86.4	75.8	32.5	60.6	15.3	77.7	<7.2	53.1	19.9	32.8	80.8
	W-3(4.5)	6/3/2011	4.5	<19.1	<76.5	<8.2	<8.2	<8.2	<8.2	<8.2	13.0	32.3	29.1	33.2	11.9	21.2	<8.2	17.4	<8.2	20.5	10.2	9.4	22.3
	W-4(4.5)	6/3/2011	4.5	<17.8	193	23.6	21.8	475	78.9	1,310	2,210	900	1,740	300	712	2,710	152	5,130	628	300	14.5	3,500	3,460
	W-5(4.5)	6/3/2011	4.5	110	1,370	<7.3	<7.3	<7.3	<7.3	<7.3	28.8	48.1	63.0	33.3	33.3	65.8	8.6	38.6	<7.3	22.5	<7.3	16.6	54.4
	W-6(4.5)	6/3/2011	4.5	40.8	700	<7.5	<7.5	<7.5	10.7	9.4	67.5	116	125	101	40.0	98.1	23.4	79.1	<7.5	71.7	19.9	36.9	102
	W-7(4.5)	6/3/2011	4.5	<18.8	99.1	<8.0	18.2	8.9	58.9	43.7	247	450	362	322	177	300	58.0	361	<8.0	246	63.1	75.6	512
	W-8(4.0)	6/3/2011	4.0	19.2	324	<7.5	9.9	<7.5	11.2	17.8	69.7	90.2	87.9	99.7	55.2	81.3	20.1	95.9	8.8	65.6	32.3	43.2	105
	W-9(4.5)	6/3/2011	4.5	29.1	435	10.1	22.8	7.6	24.7	14.3	83.3	160	140	131	65.6	107	23.8	99.9	<7.6	96.5	70.7	62.7	130
	W-10(4.5)	6/3/2011	4.5	<17.9	274	<7.7	<7.7	<7.7	9.6	7.8	30.5	51.4	52.9	52.6	28.2	43.5	8.7	41.6	<7.7	33.2	11.7	19.2	51.2
Pier 2 North	P2-N-1(4.5)	6/3/2011	4.5	<16.1	<64.4	<7.3	<7.3	<7.3	10.2	<7.3	19.9	49.4	41.5	37.2	23.1	25.4	<7.3	20.4	<7.3	27.0	<7.3	<7.3	28.5
	P2-N-2(4.5)	6/3/2011	4.5	<16.8	<67.1	<7.3	<7.3	<7.3	<7.3	<7.3	13.0	26.4	21.9	35.2	11.5	16.0	<7.3	13.2	<7.3	19.6	<7.3	<7.3	19.6
	P2-N-3(4.5)	6/3/2011	4.5	<18.0	<72.0	<7.8	<7.8	<7.8	<7.8	<7.8	14.7	31.1	27.1	27.0	14.2	17.9	<7.8	15.8	<7.8	17.0	<7.8	<7.8	20.1
	P2-N-4(4.5)	6/3/2011	4.5	19.2	198	11.3	16.6	67.1	11.1	85.8	696	899	1,110	456	476	660	133	823	28.7	436	19.6	343	791
	P2-N-5(4.5)	6/3/2011	4.5	<17.1	<68.6	<7.2	<7.2	<7.2	<7.2	<7.2	12.5	25.4	22.8	108	9.4	17	18	13.5	<7.2	74.5	<7.2	<7.2	19
	P2-N-6(4.5)	6/3/2011	4.5	<16.6	<66.2	<7.2	<7.2	<7.2	11.4	<7.2	30.4	57.5	48.5	46.4	27.0	32.5	7.9	30.7	<7.2	32.3	<7.2	9.3	39.7
Pier 2 South	P2-S-7(4.0)	6/3/2011	4.0	<17.2	<68.7	<7.3	<7.3	<7.3	15.1	<7.3	38.1	70.6	57.8	40.7	32.0	41.0	<7.3	35.3	<7.3	30.8	<7.3	8.0	53.4
	P2-S-8(4.0)	6/3/2011	4.0	<16.6	<66.5	<7.1	<7.1	<7.1	<7.1	<7.1	16.3	31.4	26.3	26.5	14.1	19.0	<7.1	13.8	<7.1	17.9	<7.1	<7.1	21.5
	P2-S-9(4.0)	6/3/2011	4.0	<16.3	<65.3	<7.1	<7.1	<7.1	<7.1	<7.1	8.0	16.7	15.6	17.2	<7.1	8.7	<7.1	7.8	<7.1	9.6	<7.1	<7.1	10.1
	P2-S-10(4.0)	6/3/2011	4.0	<16.8	<67.4	<7.2	<7.2	<7.2	<7.2	<7.2	12.3	22.6	19.6	28.5	8.7	13.3	<7.2	12.5	<7.2	15.2	<7.2	<7.2	16.2
<i>DEO RBCs</i>																							
Soil Ingestion, Dermal Contact, and Inhalation - Occupational				7.0E+04	>Max	--	--	6.1E+07	--	>Max	2.7E+03	270	2.7E+03	--	2.7E+04	2.7E+05	270	2.9E+07	4.1E+07	2.7E+03	2.3E+04	--	2.1E+07

Notes:

1. feet bgs = Feet below the ground surface.
2. **Bold** values denote concentrations detected above method reporting limits (MRLs).
3. < = Not detected at or above the MRL.
4. Highlighted values exceed the Oregon Department of Environmental Quality (DEQ) Risk-Based Concentration (RBC) for direct contact in an Occupational Scenario.
5. -- = Data not available or not applicable.
6. >Max = The constituent RBC for this pathway is greater than 100,000 mg/kg or 100,000 mg/L. The Oregon DEQ believes it is highly unlikely that such concentrations will ever be encountered.
7. TPH-d = Total petroleum hydrocarbons as diesel.
8. TPH-o = Total petroleum hydrocarbons as oil.
9. DEO RBCs from: Oregon Department of Environmental Quality's *Risk-Based Decision Making for the Remediation* (RBC Spreadsheet updated September 15, 2009).

of Petroleum-Contaminated Sites. September 22, 2003

Table 3
Mean Concentrations (90% Upper Confidence Limit) - Western Pile
T4S1 Stock Pile Sampling
Portland, Oregon

Analyte	Mean (90% UCL)	Units	RBC ¹	Method ²
1-Methylnaphthalene	14.26	mg/kg	--	90% KM (t) UCL
	15.77	mg/kg		90% KM (Percentile Bootstrap) UCL
2-Methylnaphthalene	19.16	mg/kg	--	90% KM (t) UCL
	21.06	mg/kg		90% KM (Percentile Bootstrap) UCL
Acenaphthene	92.14	mg/kg	6.1E+07	90% KM (t) UCL
	32.07	mg/kg		90% KM (t) UCL
Acenaphthylene	32.5	mg/kg	--	90% KM (Percentile Bootstrap) UCL
Anthracene	369.3	mg/kg	>Max	90% KM (Chebyshev) UCL
Benzo(a)anthracene	729.4	mg/kg	2.7E+03	90% KM (Chebyshev) UCL
Benzo(a)pyrene	538.2	mg/kg	270	90% Chebyshev(Mean, Sd) UCL
Benzo(b)fluoranthene	554.2	mg/kg	2.7E+03	90% KM (Chebyshev) UCL
Benzo(g,h,i)perylene	347.1	mg/kg	--	90% KM (Chebyshev) UCL
Benzo(k)fluoranthene	360.2	mg/kg	2.7E+04	90% KM (Chebyshev) UCL
Chrysene	798.4	mg/kg	2.7E+05	90% KM (Chebyshev) UCL
Dibenz(a,h)anthracene	45.15	mg/kg	270	90% KM (t) UCL
	44.25	mg/kg		90% KM (Percentile Bootstrap) UCL
Fluoranthene	1442	mg/kg	2.9E+07	90% KM (Chebyshev) UCL
Fluorene	209.9	mg/kg	4.1E+07	90% KM (Chebyshev) UCL
Indeno(1,2,3-cd)pyrene	121.1	mg/kg	2.7E+03	90% KM (BCA) UCL
Naphthalene	39.47	mg/kg	2.3E+04	90% KM (t) UCL
Phenanthrene	973.1	mg/kg	--	90% KM (Chebyshev) UCL
Pyrene	1082	mg/kg	2.1E+07	90% Chebyshev(Mean, Sd) UCL
TPH-d	40.63	mg/kg	7.0E+04	90% KM (t) UCL
	47.27	mg/kg		90% KM (Percentile Bootstrap) UCL
TPH-o	468.9	mg/kg	>Max	90% KM (BCA) UCL

Notes:

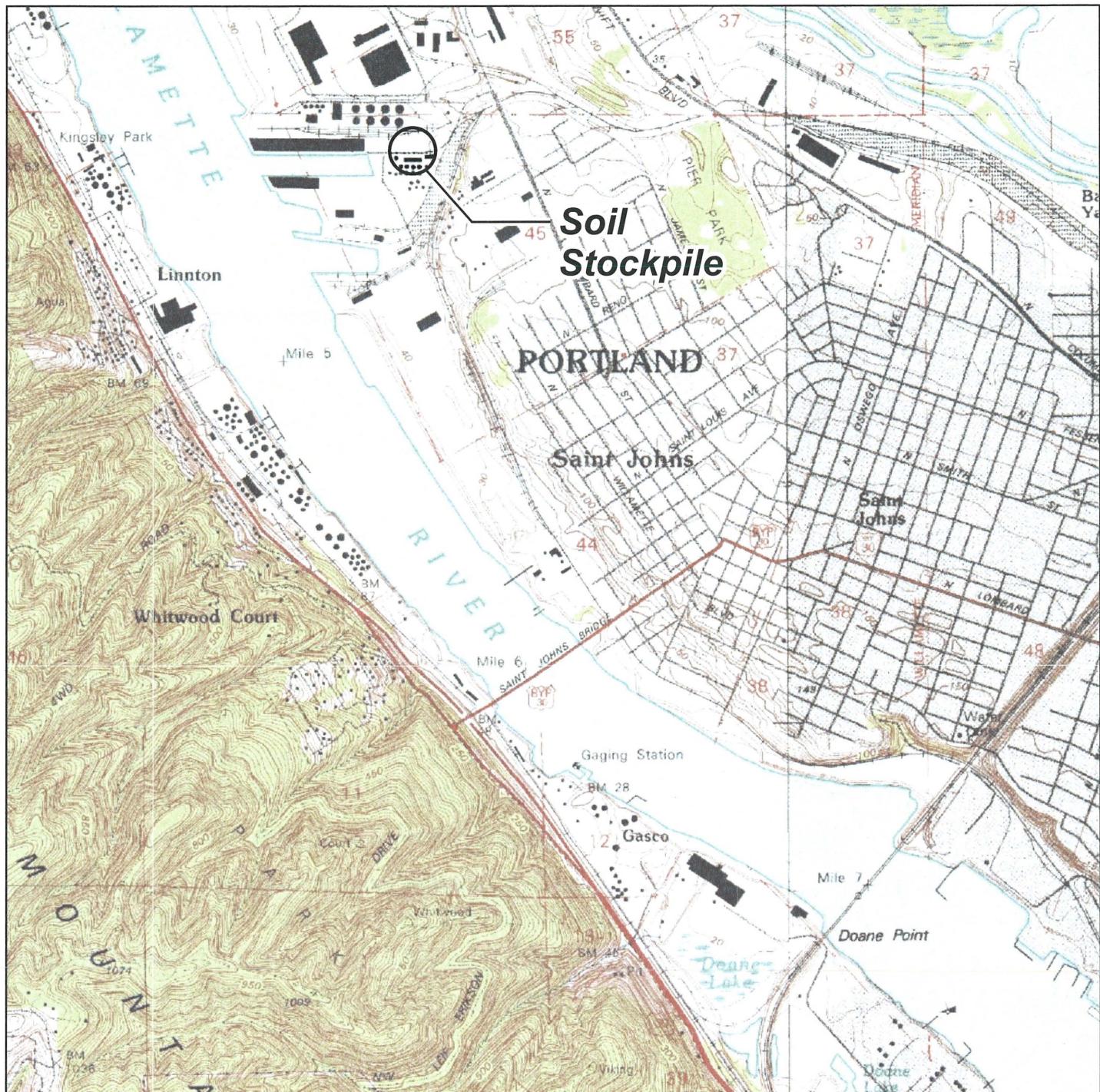
1. DEQ Risk-Based Value (RBC) used is for direct contact in an Occupational Scenario.
2. Methods were determined by using the approach recommended by ProUCL v. 4.1 at the 95% confidence level. For some analytes, two methods were recommended.
3. UCL = Upper Confidence Limit.
4. Highlighted value exceeds the DEQ RBC.
5. -- = Data not available. RBC not available, or mean concentration was not calculated due to lack of detections over reporting limits

Table 4
Mean Concentrations (90% Upper Confidence Limit) - Pier 2 Pile
T4S1 Stock Pile Sampling
Portland, Oregon

Analyte	Mean (90% UCL)	Units	RBC ¹	Method ²
1-Methylnaphthalene	--	mg/kg	--	--
2-Methylnaphthalene	--	mg/kg	--	--
Acenaphthene	--	mg/kg	6.1E+07	--
Acenaphthylene	11.64	mg/kg	--	90% KM (t) UCL
	12.16	mg/kg	--	90% KM (bootstrap t) UCL
Anthracene	--	mg/kg	>Max	--
Benzo(a)anthracene	289.6	mg/kg	2.7E+03	90% Chebyshev(Mean, Sd) UCL
Benzo(a)pyrene	382.2	mg/kg	270	90% Chebyshev(Mean, Sd) UCL
Benzo(b)fluoranthene	463	mg/kg	2.7E+03	90% Chebyshev(Mean, Sd) UCL
Benzo(g,h,i)perylene	209.1	mg/kg	--	90% Chebyshev(Mean, Sd) UCL
Benzo(k)fluoranthene	201.4	mg/kg	2.7E+04	90% KM (Chebyshev) UCL
Chrysene	276.9	mg/kg	2.7E+05	90% Chebyshev(Mean, Sd) UCL
Dibenz(a,h)anthracene	41.41	mg/kg	--	90% KM (t) UCL
	134.1	mg/kg	270	90% KM (bootstrap t) UCL
Fluoranthene	340.2	mg/kg	2.9E+07	90% Chebyshev(Mean, Sd) UCL
Fluorene	191.9	mg/kg	4.1E+07	90% Chebyshev(Mean, Sd) UCL
Indeno(1,2,3-cd)pyrene	--	mg/kg	2.7E+03	--
Naphthalene	158.4	mg/kg	2.3E+04	90% KM (Chebyshev) UCL
Phenanthrene	--	mg/kg	--	--
Pyrene	331.9	mg/kg	2.1E+07	90% Chebyshev(Mean, Sd) UCL
TPH-d	--	mg/kg	7.0E+04	--
TPH-o	--	mg/kg	>Max	--

Notes:

1. DEQ Risk-Based Value (RBC) used is for direct contact in an Occupational Scenario.
2. Methods were determined by using the approach recommended by ProUCL v. 4.1 at the 95% confidence level. For some analytes, two methods were recommended.
3. UCL = Upper Confidence Limit.
4. Highlighted value exceeds the DEQ RBC.
5. -- = Data not available. RBC not available, or mean concentration was not calculated due to lack of detections over reporting limits.



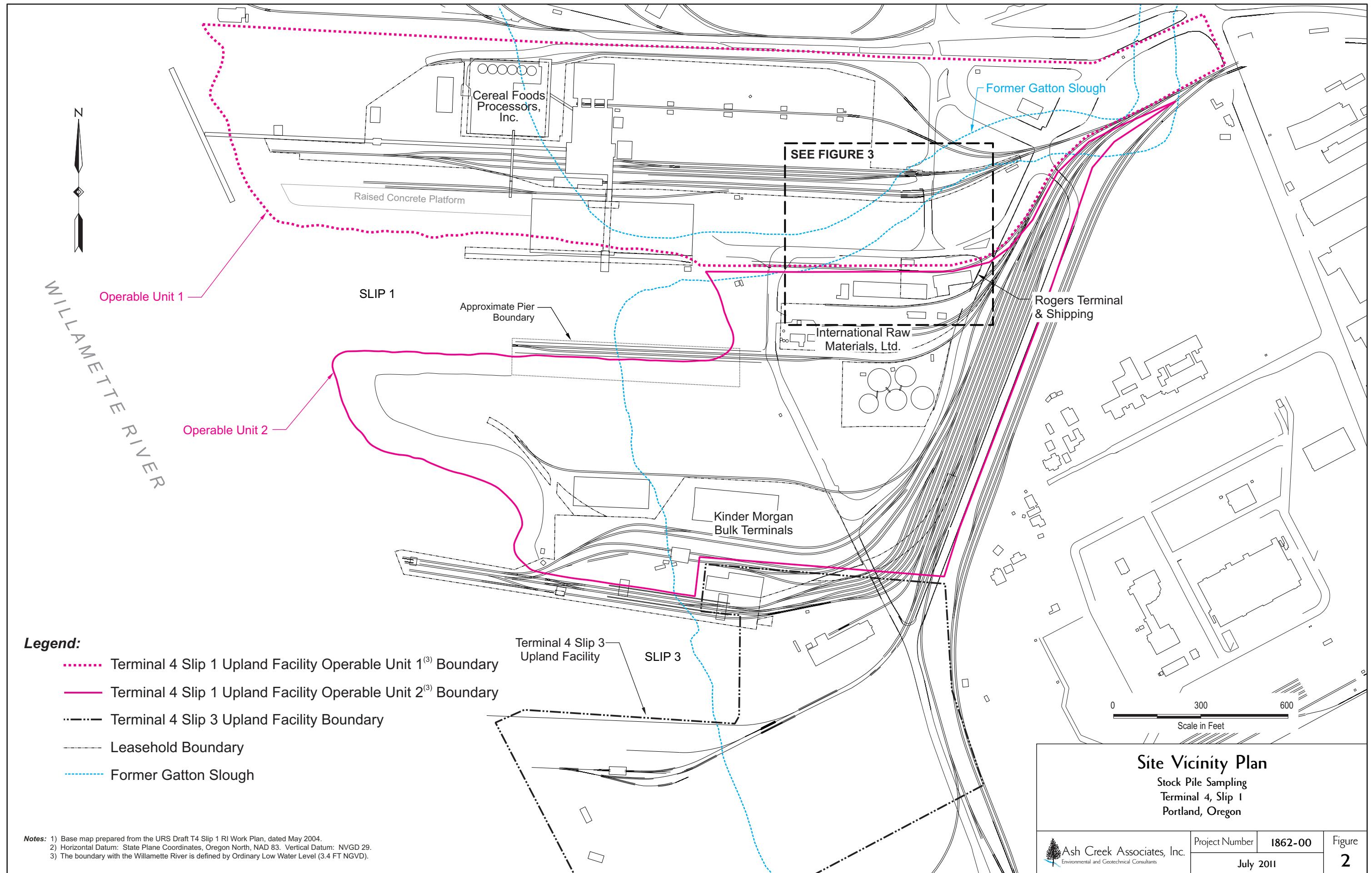
Base map prepared from USGS 7.5-minute quadrangles as provided by TerraServer.

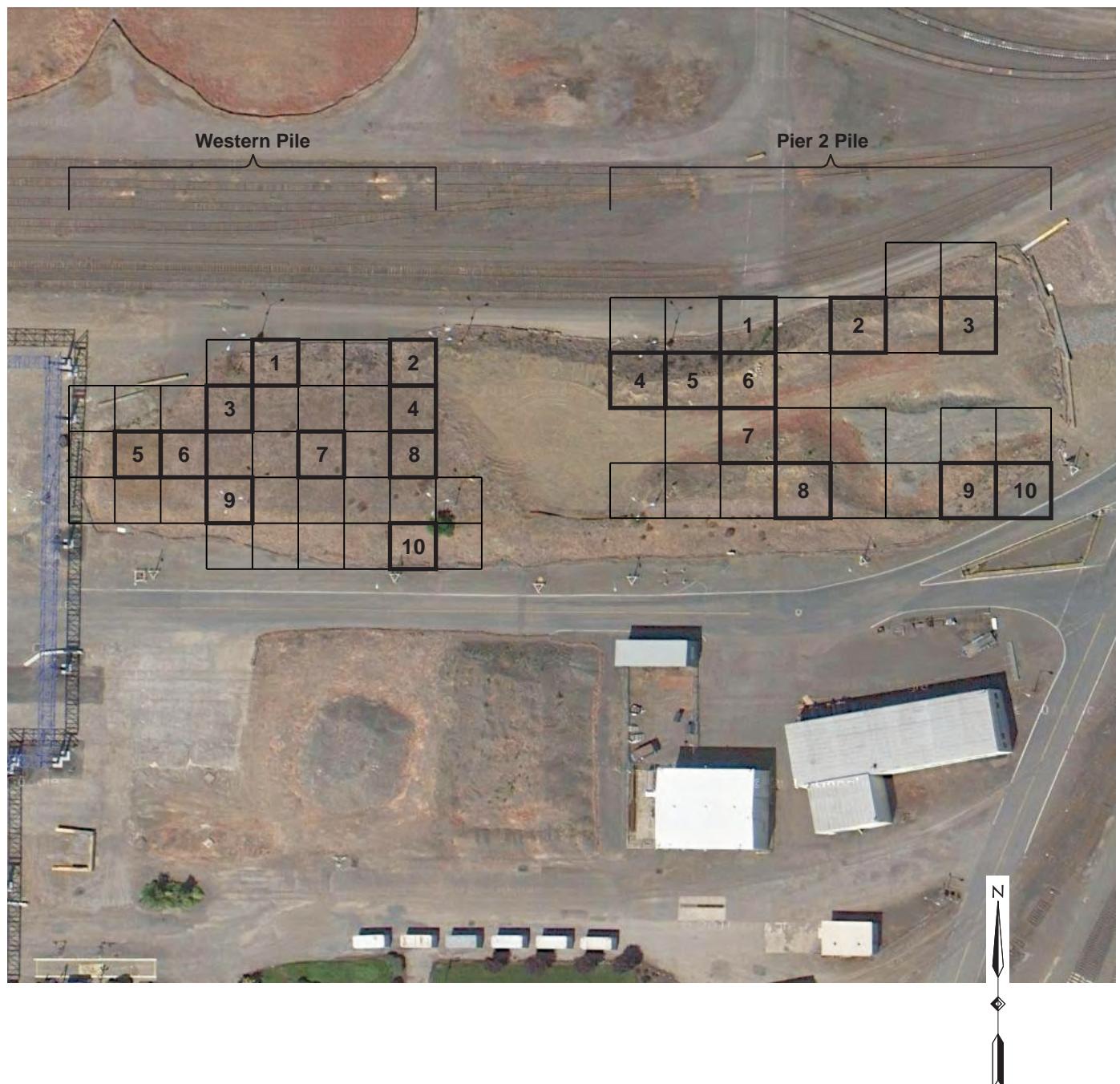


Facility Location Map

**Stock Pile Sampling
Terminal 4, Slip 1
Portland, Oregon**







Legend:

- Cell Location
- 10 Sample Location

Soil Sampling Locations

Stock Pile Sampling
Terminal 4, Slip 1
Portland, Oregon

NOTE: Base map prepared from 2011 - Google Imagery.
Aerial dated August 15, 2010.

Attachment A

SOPs 2.1 and 2.3

STANDARD OPERATING PROCEDURE

SOP Number: 2.1

STANDARD FIELD SCREENING PROCEDURES

Date: November 9, 2009

Revision Number: 1.1

Page: 1 of 2

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) provides instructions for standard field screening. Field screening results are used to aid in the selection of soil samples for chemical analysis. This procedure is applicable during all Ash Creek Associates (ACA) soil sampling operations.

Standard field screening techniques include the use of a photoionization detector (PID) to assess for volatile organic compounds (VOCs), for the presence of separate-phase petroleum hydrocarbons using a sheen test. These methods will not detect all potential contaminants, so selection of screening techniques shall be based on an understanding of the site history. The PID is not compound or concentration-specific, but it can provide a qualitative indication of the presence of VOCs. PID measurements are affected by other field parameters such as temperature and soil moisture. Other field screening methods, such as screening for dense non-aqueous phase liquid (DNAPL) using dye or UV light, are not considered "standard" and will be detailed in the site-specific sampling and analysis plan (SAP).

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- PID with calibration gas (record daily calibration/calibration check in field notes);
- Plastic resealable bags (for PID measurement); and
- Glass jars or stainless steel bowls (for sheen testing).

3. METHODOLOGY

Each soil sample will be field screened for VOCs using a PID and for the presence of separate-phase petroleum hydrocarbons using a sheen test. If the presence of DNAPL is suspected, then screening using dye and UV light may also to be completed. For information regarding screening using dye or UV light, refer to the site specific sampling and analysis plan.

PID lamps come in multiple sizes, typically 9.8, 10.6, and 11.7 electron volts (eV). The eV rating for the lamp must be greater than the ionization potential (in eV) of a compound in order for the PID to detect the compound. For petroleum hydrocarbons, a lamp of at least 9.8 eV should be used. For typical chlorinated alkenes (dichloroethene, trichloroethene, tetrachloroethene, or vinyl chloride.), a lamp of at least 10.6 eV should be used. The compatibility of the lamp size with the site constituents should be verified prior to the field event and will be detailed in the site-specific SAP.

PID Calibration Procedure: The PID used on-site should be calibrated daily or more frequently if needed. Calibration of the PID should be documented in field notes. Calibrations procedures should be conducted according to the manufacturer's instructions. .

PID Screening Procedure:

- Place a representative portion (approximately one ounce) of freshly exposed, uncompacted soil into a clean resealable plastic bag.
- Seal the bag and break up the soil to expose vapors from the soil matrix.
- Allow the bag to sit to reach ambient temperature. Note: Ambient temperature and weather conditions/humidity should be recorded in field notes. Changes in ambient temperature and weather during the field work should also be recorded, as temperature and humidity can affect PID readings.
- Carefully insert the intake port of the PID into the plastic bag.
- Record the PID measurement in the field notes or boring logs.

Sheen Test Procedure:

- Following the PID screen, place approximately one ounce of freshly exposed, uncompacted soil into a clean glass jar or stainless steel bowl.

STANDARD OPERATING PROCEDURE

SOP Number: 2.1

STANDARD FIELD SCREENING PROCEDURES

Date: November 9, 2009

Revision Number: 1.1

Page: 2 of 2

- Add enough water to cover the sample.
- Observe the water surface for signs of discoloration/sheen and characterize

No Sheen (NS)	No visible sheen on the water surface
Biogenic Film (BF)	Dull, platy/blocky or foamy film.
Slight Sheen (SS)	Light sheen with irregular spread, not rapid. May have small spots of color/iridescence. Majority of water surface not covered by sheen.
Moderate Sheen (MS)	Medium to heavy coverage, some color/iridescence, spread is irregular to flowing. Sheen covering a large portion of water surface.
Heavy Sheen (HS)	Heavy sheen coverage with color/iridescence, spread is rapid, entire water surface covered with sheen. Separate-phase hydrocarbons may be evident during sheen test.

STANDARD OPERATING PROCEDURE

SOP Number: 2.3

TEST PIT EXPLORATION PROCEDURES

Date: August 27, 2007

Revision Number: 0

Page: 1 of 1

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods for observing and sampling from test pits and trenches. Test pits/trenches are utilized for environmental observations and sampling when subsurface observation is required in multiple dimensions. This procedure is applicable during all Ash Creek Associates (ACA) test pit and trenching activities.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Stakes, flagging/caution tape, measuring tape, and sheet plastic
- Sampling equipment and laboratory-supplied sample containers
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by project Health and Safety Plan)

3. METHODOLOGYExcavation Procedure:

Verify that the subcontractor decontaminates all excavation equipment (per SOP 1.2) before and after all test pits/trenches. Communicate the excavation depth and extent to the excavation subcontractor as specified in the project-specific plan. Excavation sidewalls should initially be cut as near to vertical as possible to facilitate stratigraphic observation. It is ACA's general policy not to enter test pit excavations. If the nature of the project requires test pit entry, the slope or bench the excavation sidewalls in accordance with Occupational Health and Safety Administration requirements. Test pits deeper than 4 feet should never be entered, unless appropriate sloping or benching is in place.

The excavation subcontractor should place the excavated soils to one side of the excavation, no closer than 2 to 3 feet from the edge of excavation. Sheet plastic may be required to cover the ground surface before placing excavation soils on the ground.

Proceed slowly and with caution during the excavation. View the excavation (from the far end wall) after each bucket of soil is removed for waste accumulations, free liquids (water or free product), buried utilities, and other items designated in the project-specific plan.

Logging and Sample Collection:

Sketch a vertical profile depicting the physical orientation of the strata, soil types, depth of stratigraphic changes, depth to water table, identification of waste materials, and the depth/location of any environmental samples that were collected. Record the dimensions and orientation of each test pit/trench. Collect soil samples directly from the excavator bucket, taking care to collect soil that has not been in contact with the bucket. Complete field screening as specified in SOP-2.1. Collect samples in accordance with the surface soil sample procedures specified in SOP-2.2.

Backfilling the Excavation:

Backfill the test pit once completed or at the end of the work day. Open test pits left unsupervised must be secured to prevent accidental entry. Return soils from the deeper portion of the test pit first. Periodically, project-specific requirements may include the use of clean backfill material and disposing test pit spoils. Unless otherwise directed, test pits should be compacted to a dense, non-yielding state. If possible, mound the test pit to prevent accumulation of surface water after settlement.

Attachment B

Photograph Log

APPENDIX B PHOTOGRAPH LOG

Project Name: T4S1 Stockpile Characterization
Project Number: 1862-00

Client: Port of Portland
Location: Portland, Oregon

Photo No: 1	
Photo Date: June 3, 2011	 A photograph showing a large industrial facility with several tall buildings and structures in the background. In the foreground, there is a grassy hillside with a single red flag visible on the ground.
Orientation: West	
Description: Pier 2 Pile with lath identifying sample location P2-N-5(4.5) before excavation.	
Photo No: 2	
Photo Date: June 3, 2011	 A photograph of a test pit dug into a grassy hillside. The pit is circular and deep, exposing dark soil. There is some vegetation growing around the edges of the pit.
Orientation: North	
Description: Test pit where sample P2-N-6(4.5) was sampled from Pier 2 Pile.	

APPENDIX B PHOTOGRAPH LOG

Project Name: T4S1 Stockpile Characterization
Project Number: 1862-00

Client: Port of Portland
Location: Portland, Oregon

Photo No: 3	
Photo Date: June 3, 2011	
Orientation: Southeast	
Description: Large pieces of asphalt-concrete observed on surface of Pier 2 Pile, approximately 1-2 feet in diameter.	
Photo No: 4	
Photo Date: June 3, 2011	
Orientation: West	
Description: Looking towards Western Pile from Pier 2 Pile.	

APPENDIX B PHOTOGRAPH LOG

Project Name: T4S1 Stockpile Characterization
Project Number: 1862-00

Client: Port of Portland
Location: Portland, Oregon

Photo No:	5
Photo Date:	June 3, 2011
Orientation:	Southwest
Description:	Test pitting prior to collecting sample P2-S-8(4.0) from Pier 2 Pile.



Attachment C

Analytical Laboratory Reports

June 13, 2011

Chris Sheridan
Ash Creek Associates
3015 SW 1st Avenue
Portland, OR 972014707

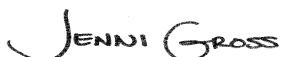
RE: Project: T4S1-Stockpile sampling1862-00
Pace Project No.: 257972

Dear Chris Sheridan:

Enclosed are the analytical results for sample(s) received by the laboratory on June 04, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jennifer Gross

jennifer.gross@pacelabs.com
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: T4S1-Stockpile sampling1862-00
Pace Project No.: 257972

Washington Certification IDs

940 South Harney Street, Seattle, WA 98108
Alaska CS Certification #: UST-025
Alaska Drinking Water VOC Certification #: WA01230
Alaska Drinking Water Micro Certification #: WA01230

California Certification #: 01153CA
Florida/NELAP Certification #: E87617
Oregon Certification #: WA200007
Washington Certification #: C1229

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: T4S1-Stockpile sampling1862-00
Pace Project No.: 257972

Lab ID	Sample ID	Method	Analysts	Analytics Reported	Laboratory
257972001	W-5(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972002	W-6(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972003	W-3(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972004	W-9(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972005	W-1(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972006	W-7(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972007	W-2(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972008	W-4(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972009	W-8(4.0)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972010	W-10(4.5)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972011	P2-S-10(4.0)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972012	P2-S-9(4.0)	NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
257972013	P2-N-1(4.5)	NWTPH-Dx	AY1	4	PASI-S
		NWTPH-Dx	AY1	4	PASI-S

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: T4S1-Stockpile sampling1862-00
Pace Project No.: 257972

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
257972014	P2-N-6(4.5)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
		EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
257972015	P2-S-8(4.0)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
257972016	P2-N-4(4.5)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
257972017	P2-N-5(4.5)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
257972018	P2-N-2(4.5)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
257972019	P2-N-3(4.5)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S
		NWTPH-Dx	AY1	4	PASI-S
257972020	P2-S-7(4.0)	EPA 8270 by SIM	ERB	20	PASI-S
		ASTM D2974-87	KJ1	1	PASI-S

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-5(4.5) Lab ID: 257972001 Collected: 06/03/11 10:15 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	110	mg/kg	17.2	1	06/06/11 16:45	06/07/11 16:15		
Motor Oil Range SG	1370	mg/kg	68.8	1	06/06/11 16:45	06/07/11 16:15	64742-65-0	
n-Octacosane (S) SG	136 %		50-150	1	06/06/11 16:45	06/07/11 16:15	630-02-4	
o-Terphenyl (S) SG	120 %		50-150	1	06/06/11 16:45	06/07/11 16:15	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	90-12-0	
2-Methylnaphthalene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	91-57-6	
Acenaphthene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	83-32-9	
Acenaphthylene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	208-96-8	
Anthracene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	120-12-7	
Benzo(a)anthracene	28.8	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	56-55-3	
Benzo(a)pyrene	48.1	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	50-32-8	
Benzo(b)fluoranthene	63.0	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	205-99-2	
Benzo(g,h,i)perylene	33.3	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	191-24-2	
Benzo(k)fluoranthene	33.3	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	207-08-9	
Chrysene	65.8	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	218-01-9	
Dibenz(a,h)anthracene	8.6	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	53-70-3	
Fluoranthene	38.6	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	206-44-0	
Fluorene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	86-73-7	
Indeno(1,2,3-cd)pyrene	22.5	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	193-39-5	
Naphthalene	ND	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	91-20-3	
Phenanthrene	16.6	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	85-01-8	
Pyrene	54.4	ug/kg	7.3	1	06/06/11 16:55	06/08/11 20:48	129-00-0	
2-Fluorobiphenyl (S)	64 %		31-131	1	06/06/11 16:55	06/08/11 20:48	321-60-8	
Terphenyl-d14 (S)	68 %		30-133	1	06/06/11 16:55	06/08/11 20:48	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	9.0 %		0.10	1		06/06/11 15:51		

Sample: W-6(4.5) Lab ID: 257972002 Collected: 06/03/11 10:30 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	40.8	mg/kg	18.0	1	06/06/11 16:45	06/07/11 15:59		
Motor Oil Range SG	700	mg/kg	72.1	1	06/06/11 16:45	06/07/11 15:59	64742-65-0	
n-Octacosane (S) SG	133 %		50-150	1	06/06/11 16:45	06/07/11 15:59	630-02-4	
o-Terphenyl (S) SG	110 %		50-150	1	06/06/11 16:45	06/07/11 15:59	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND	ug/kg	7.5	1	06/06/11 16:55	06/08/11 15:31	90-12-0	
2-Methylnaphthalene	ND	ug/kg	7.5	1	06/06/11 16:55	06/08/11 15:31	91-57-6	

Date: 06/13/2011 02:18 PM

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-6(4.5) Lab ID: 257972002 Collected: 06/03/11 10:30 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
Acenaphthene	ND ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	83-32-9	
Acenaphthylene	10.7 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	208-96-8	
Anthracene	9.4 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	120-12-7	
Benzo(a)anthracene	67.5 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	56-55-3	
Benzo(a)pyrene	116 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	50-32-8	
Benzo(b)fluoranthene	125 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	205-99-2	
Benzo(g,h,i)perylene	101 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	191-24-2	
Benzo(k)fluoranthene	40.0 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	207-08-9	
Chrysene	98.1 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	218-01-9	
Dibenz(a,h)anthracene	23.4 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	53-70-3	
Fluoranthene	79.1 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	206-44-0	
Fluorene	ND ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	86-73-7	
Indeno(1,2,3-cd)pyrene	71.7 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	193-39-5	
Naphthalene	19.9 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	91-20-3	
Phenanthrene	36.9 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	85-01-8	
Pyrene	102 ug/kg		7.5	1	06/06/11 16:55	06/08/11 15:31	129-00-0	
2-Fluorobiphenyl (S)	60 %		31-131	1	06/06/11 16:55	06/08/11 15:31	321-60-8	
Terphenyl-d14 (S)	60 %		30-133	1	06/06/11 16:55	06/08/11 15:31	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	13.7 %		0.10	1		06/06/11 15:55		

Sample: W-3(4.5) Lab ID: 257972003 Collected: 06/03/11 10:50 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel		Analytical Method: NWTPH-Dx Preparation Method: EPA 3546						
Diesel Range SG	ND mg/kg		19.1	1	06/06/11 16:45	06/07/11 18:09		
Motor Oil Range SG	ND mg/kg		76.5	1	06/06/11 16:45	06/07/11 18:09	64742-65-0	
n-Octacosane (S) SG	106 %		50-150	1	06/06/11 16:45	06/07/11 18:09	630-02-4	
o-Terphenyl (S) SG	101 %		50-150	1	06/06/11 16:45	06/07/11 18:09	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	90-12-0	
2-Methylnaphthalene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	91-57-6	
Acenaphthene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	83-32-9	
Acenaphthylene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	208-96-8	
Anthracene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	120-12-7	
Benzo(a)anthracene	13.0 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	56-55-3	
Benzo(a)pyrene	32.3 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	50-32-8	
Benzo(b)fluoranthene	29.1 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	205-99-2	
Benzo(g,h,i)perylene	33.2 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	191-24-2	
Benzo(k)fluoranthene	11.9 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	207-08-9	

Date: 06/13/2011 02:18 PM

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-3(4.5) Lab ID: 257972003 Collected: 06/03/11 10:50 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
Chrysene	21.2 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	53-70-3	
Fluoranthene	17.4 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	206-44-0	
Fluorene	ND ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	86-73-7	
Indeno(1,2,3-cd)pyrene	20.5 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	193-39-5	
Naphthalene	10.2 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	91-20-3	
Phenanthrene	9.4 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	85-01-8	
Pyrene	22.3 ug/kg		8.2	1	06/06/11 16:55	06/08/11 15:48	129-00-0	
2-Fluorobiphenyl (S)	74 %		31-131	1	06/06/11 16:55	06/08/11 15:48	321-60-8	
Terphenyl-d14 (S)	71 %		30-133	1	06/06/11 16:55	06/08/11 15:48	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	18.9 %		0.10	1		06/06/11 15:58		

Sample: W-9(4.5) Lab ID: 257972004 Collected: 06/03/11 11:05 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	29.1 mg/kg		18.1	1	06/06/11 16:45	06/07/11 16:47		
Motor Oil Range SG	435 mg/kg		72.4	1	06/06/11 16:45	06/07/11 16:47	64742-65-0	
n-Octacosane (S) SG	116 %		50-150	1	06/06/11 16:45	06/07/11 16:47	630-02-4	
o-Terphenyl (S) SG	112 %		50-150	1	06/06/11 16:45	06/07/11 16:47	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	10.1 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	90-12-0	
2-Methylnaphthalene	22.8 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	91-57-6	
Acenaphthene	7.6 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	83-32-9	
Acenaphthylene	24.7 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	208-96-8	
Anthracene	14.3 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	120-12-7	
Benzo(a)anthracene	83.3 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	56-55-3	
Benzo(a)pyrene	160 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	50-32-8	
Benzo(b)fluoranthene	140 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	205-99-2	
Benzo(g,h,i)perylene	131 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	191-24-2	
Benzo(k)fluoranthene	65.6 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	207-08-9	
Chrysene	107 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	218-01-9	
Dibenz(a,h)anthracene	23.8 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	53-70-3	
Fluoranthene	99.9 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	206-44-0	
Fluorene	ND ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	86-73-7	
Indeno(1,2,3-cd)pyrene	96.5 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	193-39-5	
Naphthalene	70.7 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	91-20-3	
Phenanthrene	62.7 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	85-01-8	
Pyrene	130 ug/kg		7.6	1	06/06/11 16:55	06/08/11 16:05	129-00-0	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-9(4.5) Lab ID: 257972004 Collected: 06/03/11 11:05 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
2-Fluorobiphenyl (S)	70 %		31-131	1	06/06/11 16:55	06/08/11 16:05	321-60-8	
Terphenyl-d14 (S)	71 %		30-133	1	06/06/11 16:55	06/08/11 16:05	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	14.0 %		0.10	1		06/06/11 16:01		

Sample: W-1(4.5) Lab ID: 257972005 Collected: 06/03/11 11:20 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	58.4 mg/kg		19.5	1	06/06/11 16:45	06/07/11 17:04		
Motor Oil Range SG	582 mg/kg		77.8	1	06/06/11 16:45	06/07/11 17:04	64742-65-0	
n-Octacosane (S) SG	108 %		50-150	1	06/06/11 16:45	06/07/11 17:04	630-02-4	
o-Terphenyl (S) SG	108 %		50-150	1	06/06/11 16:45	06/07/11 17:04	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	13.8 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	90-12-0	
2-Methylnaphthalene	28.9 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	91-57-6	
Acenaphthene	19.0 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	83-32-9	
Acenaphthylene	25.3 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	208-96-8	
Anthracene	15.8 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	120-12-7	
Benzo(a)anthracene	72.4 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	56-55-3	
Benzo(a)pyrene	133 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	50-32-8	
Benzo(b)fluoranthene	108 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	205-99-2	
Benzo(g,h,i)perylene	103 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	191-24-2	
Benzo(k)fluoranthene	55.5 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	207-08-9	
Chrysene	92.5 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	218-01-9	
Dibenz(a,h)anthracene	16.5 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	53-70-3	
Fluoranthene	80.2 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	206-44-0	
Fluorene	12.2 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	86-73-7	
Indeno(1,2,3-cd)pyrene	73.8 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	193-39-5	
Naphthalene	76.5 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	91-20-3	
Phenanthrene	68.3 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	85-01-8	
Pyrene	106 ug/kg		8.1	1	06/06/11 16:55	06/08/11 16:21	129-00-0	
2-Fluorobiphenyl (S)	66 %		31-131	1	06/06/11 16:55	06/08/11 16:21	321-60-8	
Terphenyl-d14 (S)	66 %		30-133	1	06/06/11 16:55	06/08/11 16:21	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	18.1 %		0.10	1		06/06/11 16:04		

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-7(4.5) Lab ID: 257972006 Collected: 06/03/11 12:30 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		18.8	1	06/06/11 16:45	06/07/11 17:20		
Motor Oil Range SG	99.1 mg/kg		75.1	1	06/06/11 16:45	06/07/11 17:20	64742-65-0	
n-Octacosane (S) SG	114 %		50-150	1	06/06/11 16:45	06/07/11 17:20	630-02-4	
o-Terphenyl (S) SG	106 %		50-150	1	06/06/11 16:45	06/07/11 17:20	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	90-12-0	
2-Methylnaphthalene	18.2 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	91-57-6	
Acenaphthene	8.9 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	83-32-9	
Acenaphthylene	58.9 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	208-96-8	
Anthracene	43.7 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	120-12-7	
Benzo(a)anthracene	247 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	56-55-3	
Benzo(a)pyrene	450 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	50-32-8	
Benzo(b)fluoranthene	362 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	205-99-2	
Benzo(g,h,i)perylene	322 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	191-24-2	
Benzo(k)fluoranthene	177 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	207-08-9	
Chrysene	300 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	218-01-9	
Dibenz(a,h)anthracene	58.0 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	53-70-3	
Fluoranthene	361 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	206-44-0	
Fluorene	ND ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	86-73-7	
Indeno(1,2,3-cd)pyrene	246 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	193-39-5	
Naphthalene	63.1 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	91-20-3	
Phenanthrene	75.6 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	85-01-8	
Pyrene	512 ug/kg		8.0	1	06/06/11 16:55	06/08/11 16:38	129-00-0	
2-Fluorobiphenyl (S)	75 %		31-131	1	06/06/11 16:55	06/08/11 16:38	321-60-8	
Terphenyl-d14 (S)	69 %		30-133	1	06/06/11 16:55	06/08/11 16:38	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	18.4 %		0.10	1		06/06/11 16:07		

Sample: W-2(4.5) Lab ID: 257972007 Collected: 06/03/11 12:40 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		16.5	1	06/06/11 16:45	06/07/11 18:25		
Motor Oil Range SG	ND mg/kg		65.8	1	06/06/11 16:45	06/07/11 18:25	64742-65-0	
n-Octacosane (S) SG	117 %		50-150	1	06/06/11 16:45	06/07/11 18:25	630-02-4	
o-Terphenyl (S) SG	110 %		50-150	1	06/06/11 16:45	06/07/11 18:25	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	13.9 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	90-12-0	
2-Methylnaphthalene	18.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	91-57-6	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-2(4.5) Lab ID: 257972007 Collected: 06/03/11 12:40 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
Acenaphthene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	83-32-9	
Acenaphthylene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	208-96-8	
Anthracene	17.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	120-12-7	
Benzo(a)anthracene	58.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	56-55-3	
Benzo(a)pyrene	86.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	50-32-8	
Benzo(b)fluoranthene	86.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	205-99-2	
Benzo(g,h,i)perylene	75.8 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	191-24-2	
Benzo(k)fluoranthene	32.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	207-08-9	
Chrysene	60.6 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	218-01-9	
Dibenz(a,h)anthracene	15.3 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	53-70-3	
Fluoranthene	77.7 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	206-44-0	
Fluorene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	86-73-7	
Indeno(1,2,3-cd)pyrene	53.1 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	193-39-5	
Naphthalene	19.9 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	91-20-3	
Phenanthrene	32.8 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	85-01-8	
Pyrene	80.8 ug/kg		7.2	1	06/06/11 16:55	06/08/11 16:55	129-00-0	
2-Fluorobiphenyl (S)	83 %		31-131	1	06/06/11 16:55	06/08/11 16:55	321-60-8	
Terphenyl-d14 (S)	87 %		30-133	1	06/06/11 16:55	06/08/11 16:55	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	7.7 %		0.10	1		06/06/11 16:10		

Sample: W-4(4.5) Lab ID: 257972008 Collected: 06/03/11 12:50 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel		Analytical Method: NWTPH-Dx Preparation Method: EPA 3546						
Diesel Range SG	ND mg/kg		17.8	1	06/06/11 16:45	06/07/11 21:39		
Motor Oil Range SG	193 mg/kg		71.2	1	06/06/11 16:45	06/07/11 21:39	64742-65-0	
n-Octacosane (S) SG	116 %		50-150	1	06/06/11 16:45	06/07/11 21:39	630-02-4	
o-Terphenyl (S) SG	105 %		50-150	1	06/06/11 16:45	06/07/11 21:39	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	23.6 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	90-12-0	
2-Methylnaphthalene	21.8 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	91-57-6	
Acenaphthene	475 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	83-32-9	
Acenaphthylene	78.9 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	208-96-8	
Anthracene	1310 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	120-12-7	
Benzo(a)anthracene	2210 ug/kg		75.1	10	06/06/11 16:55	06/09/11 15:27	56-55-3	
Benzo(a)pyrene	900 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	50-32-8	
Benzo(b)fluoranthene	1740 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	205-99-2	
Benzo(g,h,i)perylene	300 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	191-24-2	
Benzo(k)fluoranthene	712 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	207-08-9	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-4(4.5) Lab ID: 257972008 Collected: 06/03/11 12:50 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
Chrysene	2710 ug/kg		75.1	10	06/06/11 16:55	06/09/11 15:27	218-01-9	
Dibenz(a,h)anthracene	152 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	53-70-3	
Fluoranthene	5130 ug/kg		75.1	10	06/06/11 16:55	06/09/11 15:27	206-44-0	
Fluorene	628 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	86-73-7	
Indeno(1,2,3-cd)pyrene	300 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	193-39-5	
Naphthalene	14.5 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:11	91-20-3	
Phenanthrene	3500 ug/kg		75.1	10	06/06/11 16:55	06/09/11 15:27	85-01-8	
Pyrene	3460 ug/kg		75.1	10	06/06/11 16:55	06/09/11 15:27	129-00-0	
2-Fluorobiphenyl (S)	60 %		31-131	1	06/06/11 16:55	06/08/11 17:11	321-60-8	
Terphenyl-d14 (S)	70 %		30-133	1	06/06/11 16:55	06/08/11 17:11	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	12.7 %		0.10	1		06/06/11 16:12		

Sample: W-8(4.0) Lab ID: 257972009 Collected: 06/03/11 12:55 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	19.2 mg/kg		16.7	1	06/06/11 16:45	06/07/11 21:55		
Motor Oil Range SG	324 mg/kg		66.7	1	06/06/11 16:45	06/07/11 21:55	64742-65-0	
n-Octacosane (S) SG	114 %		50-150	1	06/06/11 16:45	06/07/11 21:55	630-02-4	
o-Terphenyl (S) SG	110 %		50-150	1	06/06/11 16:45	06/07/11 21:55	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	90-12-0	
2-Methylnaphthalene	9.9 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	91-57-6	
Acenaphthene	ND ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	83-32-9	
Acenaphthylene	11.2 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	208-96-8	
Anthracene	17.8 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	120-12-7	
Benzo(a)anthracene	69.7 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	56-55-3	
Benzo(a)pyrene	90.2 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	50-32-8	
Benzo(b)fluoranthene	87.9 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	205-99-2	
Benzo(g,h,i)perylene	99.7 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	191-24-2	
Benzo(k)fluoranthene	55.2 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	207-08-9	
Chrysene	81.3 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	218-01-9	
Dibenz(a,h)anthracene	20.1 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	53-70-3	
Fluoranthene	95.9 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	206-44-0	
Fluorene	8.8 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	86-73-7	
Indeno(1,2,3-cd)pyrene	65.6 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	193-39-5	
Naphthalene	32.3 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	91-20-3	
Phenanthrene	43.2 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	85-01-8	
Pyrene	105 ug/kg		7.5	1	06/06/11 16:55	06/08/11 17:28	129-00-0	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: W-8(4.0) Lab ID: 257972009 Collected: 06/03/11 12:55 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
2-Fluorobiphenyl (S)	66 %		31-131	1	06/06/11 16:55	06/08/11 17:28	321-60-8	
Terphenyl-d14 (S)	64 %		30-133	1	06/06/11 16:55	06/08/11 17:28	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	12.4 %		0.10	1		06/06/11 16:15		

Sample: W-10(4.5) Lab ID: 257972010 Collected: 06/03/11 13:00 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		17.9	1	06/06/11 16:45	06/07/11 22:11		
Motor Oil Range SG	274 mg/kg		71.4	1	06/06/11 16:45	06/07/11 22:11	64742-65-0	
n-Octacosane (S) SG	120 %		50-150	1	06/06/11 16:45	06/07/11 22:11	630-02-4	
o-Terphenyl (S) SG	114 %		50-150	1	06/06/11 16:45	06/07/11 22:11	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	91-57-6	
Acenaphthene	ND ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	83-32-9	
Acenaphthylene	9.6 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	208-96-8	
Anthracene	7.8 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	120-12-7	
Benzo(a)anthracene	30.5 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	56-55-3	
Benzo(a)pyrene	51.4 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	50-32-8	
Benzo(b)fluoranthene	52.9 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	205-99-2	
Benzo(g,h,i)perylene	52.6 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	191-24-2	
Benzo(k)fluoranthene	28.2 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	207-08-9	
Chrysene	43.5 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	218-01-9	
Dibenz(a,h)anthracene	8.7 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	53-70-3	
Fluoranthene	41.6 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	206-44-0	
Fluorene	ND ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	86-73-7	
Indeno(1,2,3-cd)pyrene	33.2 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	193-39-5	
Naphthalene	11.7 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	91-20-3	
Phenanthrene	19.2 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	85-01-8	
Pyrene	51.2 ug/kg		7.7	1	06/06/11 16:55	06/08/11 17:45	129-00-0	
2-Fluorobiphenyl (S)	62 %		31-131	1	06/06/11 16:55	06/08/11 17:45	321-60-8	
Terphenyl-d14 (S)	61 %		30-133	1	06/06/11 16:55	06/08/11 17:45	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	13.5 %		0.10	1		06/06/11 16:19		

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-S-10(4.0) Lab ID: 257972011 Collected: 06/03/11 14:00 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		16.8	1	06/06/11 16:45	06/07/11 18:41		
Motor Oil Range SG	ND mg/kg		67.4	1	06/06/11 16:45	06/07/11 18:41	64742-65-0	
n-Octacosane (S) SG	122 %		50-150	1	06/06/11 16:45	06/07/11 18:41	630-02-4	
o-Terphenyl (S) SG	115 %		50-150	1	06/06/11 16:45	06/07/11 18:41	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	91-57-6	
Acenaphthene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	83-32-9	
Acenaphthylene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	208-96-8	
Anthracene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	120-12-7	
Benzo(a)anthracene	12.3 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	56-55-3	
Benzo(a)pyrene	22.6 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	50-32-8	
Benzo(b)fluoranthene	19.6 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	205-99-2	
Benzo(g,h,i)perylene	28.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	191-24-2	
Benzo(k)fluoranthene	8.7 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	207-08-9	
Chrysene	13.3 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	53-70-3	
Fluoranthene	12.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	206-44-0	
Fluorene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	86-73-7	
Indeno(1,2,3-cd)pyrene	15.2 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	193-39-5	
Naphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	91-20-3	
Phenanthrene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	85-01-8	
Pyrene	16.2 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:01	129-00-0	
2-Fluorobiphenyl (S)	79 %		31-131	1	06/06/11 16:55	06/08/11 18:01	321-60-8	
Terphenyl-d14 (S)	85 %		30-133	1	06/06/11 16:55	06/08/11 18:01	1718-51-0	

Percent Moisture

Analytical Method: ASTM D2974-87

Percent Moisture **7.7 %** 0.10 1 06/06/11 16:21

Sample: P2-S-9(4.0) Lab ID: 257972012 Collected: 06/03/11 14:05 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		16.3	1	06/06/11 16:45	06/07/11 18:57		
Motor Oil Range SG	ND mg/kg		65.3	1	06/06/11 16:45	06/07/11 18:57	64742-65-0	
n-Octacosane (S) SG	129 %		50-150	1	06/06/11 16:45	06/07/11 18:57	630-02-4	
o-Terphenyl (S) SG	120 %		50-150	1	06/06/11 16:45	06/07/11 18:57	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	91-57-6	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-S-9(4.0) Lab ID: 257972012 Collected: 06/03/11 14:05 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
Acenaphthene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	83-32-9	
Acenaphthylene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	208-96-8	
Anthracene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	120-12-7	
Benzo(a)anthracene	8.0 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	56-55-3	
Benzo(a)pyrene	16.7 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	50-32-8	
Benzo(b)fluoranthene	15.6 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	205-99-2	
Benzo(g,h,i)perylene	17.2 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	191-24-2	
Benzo(k)fluoranthene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	207-08-9	
Chrysene	8.7 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	53-70-3	
Fluoranthene	7.8 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	206-44-0	
Fluorene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	86-73-7	
Indeno(1,2,3-cd)pyrene	9.6 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	193-39-5	
Naphthalene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	91-20-3	
Phenanthrene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	85-01-8	
Pyrene	10.1 ug/kg		7.1	1	06/06/11 16:55	06/08/11 18:18	129-00-0	
2-Fluorobiphenyl (S)	77 %		31-131	1	06/06/11 16:55	06/08/11 18:18	321-60-8	
Terphenyl-d14 (S)	84 %		30-133	1	06/06/11 16:55	06/08/11 18:18	1718-51-0	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	7.6 %		0.10	1			06/06/11 16:23	

Sample: P2-N-1(4.5) Lab ID: 257972013 Collected: 06/03/11 14:10 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel		Analytical Method: NWTPH-Dx Preparation Method: EPA 3546						
Diesel Range SG	ND mg/kg		16.1	1	06/06/11 16:45	06/07/11 19:13		
Motor Oil Range SG	ND mg/kg		64.4	1	06/06/11 16:45	06/07/11 19:13	64742-65-0	
n-Octacosane (S) SG	119 %		50-150	1	06/06/11 16:45	06/07/11 19:13	630-02-4	
o-Terphenyl (S) SG	112 %		50-150	1	06/06/11 16:45	06/07/11 19:13	84-15-1	
8270 MSSV PAH by SIM		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
1-Methylnaphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	91-57-6	
Acenaphthene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	83-32-9	
Acenaphthylene	10.2 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	208-96-8	
Anthracene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	120-12-7	
Benzo(a)anthracene	19.9 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	56-55-3	
Benzo(a)pyrene	49.4 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	50-32-8	
Benzo(b)fluoranthene	41.5 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	205-99-2	
Benzo(g,h,i)perylene	37.2 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	191-24-2	
Benzo(k)fluoranthene	23.1 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	207-08-9	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-N-1(4.5) Lab ID: 257972013 Collected: 06/03/11 14:10 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
Chrysene	25.4 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	53-70-3	
Fluoranthene	20.4 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	206-44-0	
Fluorene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	86-73-7	
Indeno(1,2,3-cd)pyrene	27.0 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	193-39-5	
Naphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	91-20-3	
Phenanthrene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	85-01-8	
Pyrene	28.5 ug/kg		7.3	1	06/06/11 16:55	06/08/11 18:35	129-00-0	
2-Fluorobiphenyl (S)	78 %		31-131	1	06/06/11 16:55	06/08/11 18:35	321-60-8	
Terphenyl-d14 (S)	82 %		30-133	1	06/06/11 16:55	06/08/11 18:35	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	8.8 %		0.10	1		06/06/11 16:25		

Sample: P2-N-6(4.5) Lab ID: 257972014 Collected: 06/03/11 14:15 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		16.6	1	06/06/11 16:45	06/07/11 19:30		
Motor Oil Range SG	ND mg/kg		66.2	1	06/06/11 16:45	06/07/11 19:30	64742-65-0	
n-Octacosane (S) SG	124 %		50-150	1	06/06/11 16:45	06/07/11 19:30	630-02-4	
o-Terphenyl (S) SG	114 %		50-150	1	06/06/11 16:45	06/07/11 19:30	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	91-57-6	
Acenaphthene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	83-32-9	
Acenaphthylene	11.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	208-96-8	
Anthracene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	120-12-7	
Benzo(a)anthracene	30.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	56-55-3	
Benzo(a)pyrene	57.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	50-32-8	
Benzo(b)fluoranthene	48.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	205-99-2	
Benzo(g,h,i)perylene	46.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	191-24-2	
Benzo(k)fluoranthene	27.0 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	207-08-9	
Chrysene	32.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	218-01-9	
Dibenz(a,h)anthracene	7.9 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	53-70-3	
Fluoranthene	30.7 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	206-44-0	
Fluorene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	86-73-7	
Indeno(1,2,3-cd)pyrene	32.3 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	193-39-5	
Naphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	91-20-3	
Phenanthrene	9.3 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	85-01-8	
Pyrene	39.7 ug/kg		7.2	1	06/06/11 16:55	06/08/11 18:51	129-00-0	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-N-6(4.5) Lab ID: 257972014 Collected: 06/03/11 14:15 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
2-Fluorobiphenyl (S)	81 %		31-131	1	06/06/11 16:55	06/08/11 18:51	321-60-8	
Terphenyl-d14 (S)	81 %		30-133	1	06/06/11 16:55	06/08/11 18:51	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	9.1 %		0.10	1		06/06/11 16:27		

Sample: P2-S-8(4.0) Lab ID: 257972015 Collected: 06/03/11 14:20 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		16.6	1	06/06/11 16:45	06/07/11 19:46		
Motor Oil Range SG	ND mg/kg		66.5	1	06/06/11 16:45	06/07/11 19:46	64742-65-0	
n-Octacosane (S) SG	121 %		50-150	1	06/06/11 16:45	06/07/11 19:46	630-02-4	
o-Terphenyl (S) SG	112 %		50-150	1	06/06/11 16:45	06/07/11 19:46	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	91-57-6	
Acenaphthene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	83-32-9	
Acenaphthylene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	208-96-8	
Anthracene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	120-12-7	
Benzo(a)anthracene	16.3 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	56-55-3	
Benzo(a)pyrene	31.4 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	50-32-8	
Benzo(b)fluoranthene	26.3 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	205-99-2	
Benzo(g,h,i)perylene	26.5 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	191-24-2	
Benzo(k)fluoranthene	14.1 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	207-08-9	
Chrysene	19.0 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	53-70-3	
Fluoranthene	13.8 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	206-44-0	
Fluorene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	86-73-7	
Indeno(1,2,3-cd)pyrene	17.9 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	193-39-5	
Naphthalene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	91-20-3	
Phenanthrene	ND ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	85-01-8	
Pyrene	21.5 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:08	129-00-0	
2-Fluorobiphenyl (S)	77 %		31-131	1	06/06/11 16:55	06/08/11 19:08	321-60-8	
Terphenyl-d14 (S)	83 %		30-133	1	06/06/11 16:55	06/08/11 19:08	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	7.8 %		0.10	1		06/06/11 16:29		

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-N-4(4.5) Lab ID: 257972016 Collected: 06/03/11 14:55 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	19.2 mg/kg		16.5	1	06/06/11 16:45	06/07/11 22:28		
Motor Oil Range SG	198 mg/kg		66.0	1	06/06/11 16:45	06/07/11 22:28	64742-65-0	
n-Octacosane (S) SG	123 %		50-150	1	06/06/11 16:45	06/07/11 22:28	630-02-4	
o-Terphenyl (S) SG	111 %		50-150	1	06/06/11 16:45	06/07/11 22:28	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	11.3 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	90-12-0	
2-Methylnaphthalene	16.6 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	91-57-6	
Acenaphthene	67.1 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	83-32-9	
Acenaphthylene	11.1 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	208-96-8	
Anthracene	85.8 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	120-12-7	
Benzo(a)anthracene	696 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	56-55-3	
Benzo(a)pyrene	899 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	50-32-8	
Benzo(b)fluoranthene	1110 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	205-99-2	
Benzo(g,h,i)perylene	456 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	191-24-2	
Benzo(k)fluoranthene	476 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	207-08-9	
Chrysene	660 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	218-01-9	
Dibenz(a,h)anthracene	133 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	53-70-3	
Fluoranthene	823 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	206-44-0	
Fluorene	28.7 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	86-73-7	
Indeno(1,2,3-cd)pyrene	436 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	193-39-5	
Naphthalene	19.6 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	91-20-3	
Phenanthrene	343 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	85-01-8	
Pyrene	791 ug/kg		7.1	1	06/06/11 16:55	06/08/11 19:24	129-00-0	
2-Fluorobiphenyl (S)	67 %		31-131	1	06/06/11 16:55	06/08/11 19:24	321-60-8	
Terphenyl-d14 (S)	70 %		30-133	1	06/06/11 16:55	06/08/11 19:24	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	6.7 %		0.10	1		06/06/11 16:32		

Sample: P2-N-5(4.5) Lab ID: 257972017 Collected: 06/03/11 15:00 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		17.1	1	06/06/11 16:45	06/07/11 20:02		
Motor Oil Range SG	ND mg/kg		68.6	1	06/06/11 16:45	06/07/11 20:02	64742-65-0	
n-Octacosane (S) SG	127 %		50-150	1	06/06/11 16:45	06/07/11 20:02	630-02-4	
o-Terphenyl (S) SG	119 %		50-150	1	06/06/11 16:45	06/07/11 20:02	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	91-57-6	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-N-5(4.5) Lab ID: 257972017 Collected: 06/03/11 15:00 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546						
Acenaphthene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	83-32-9	
Acenaphthylene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	208-96-8	
Anthracene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	120-12-7	
Benzo(a)anthracene	12.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	56-55-3	
Benzo(a)pyrene	25.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	50-32-8	
Benzo(b)fluoranthene	22.8 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	205-99-2	
Benzo(g,h,i)perylene	108 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	191-24-2	
Benzo(k)fluoranthene	9.4 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	207-08-9	
Chrysene	17.0 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	218-01-9	
Dibenz(a,h)anthracene	18.0 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	53-70-3	
Fluoranthene	13.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	206-44-0	
Fluorene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	86-73-7	
Indeno(1,2,3-cd)pyrene	74.5 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	193-39-5	
Naphthalene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	91-20-3	
Phenanthrene	ND ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	85-01-8	
Pyrene	19.0 ug/kg		7.2	1	06/06/11 16:55	06/08/11 19:41	129-00-0	
2-Fluorobiphenyl (S)	75 %		31-131	1	06/06/11 16:55	06/08/11 19:41	321-60-8	
Terphenyl-d14 (S)	75 %		30-133	1	06/06/11 16:55	06/08/11 19:41	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	9.2 %		0.10	1		06/06/11 16:34		

Sample: P2-N-2(4.5) Lab ID: 257972018 Collected: 06/03/11 15:05 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel		Analytical Method: NWTPH-Dx Preparation Method: EPA 3546						
Diesel Range SG	ND mg/kg		16.8	1	06/06/11 16:45	06/07/11 20:18		
Motor Oil Range SG	ND mg/kg		67.1	1	06/06/11 16:45	06/07/11 20:18	64742-65-0	
n-Octacosane (S) SG	121 %		50-150	1	06/06/11 16:45	06/07/11 20:18	630-02-4	
o-Terphenyl (S) SG	112 %		50-150	1	06/06/11 16:45	06/07/11 20:18	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	91-57-6	
Acenaphthene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	83-32-9	
Acenaphthylene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	208-96-8	
Anthracene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	120-12-7	
Benzo(a)anthracene	13.0 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	56-55-3	
Benzo(a)pyrene	26.4 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	50-32-8	
Benzo(b)fluoranthene	21.9 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	205-99-2	
Benzo(g,h,i)perylene	35.2 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	191-24-2	
Benzo(k)fluoranthene	11.5 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	207-08-9	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-N-2(4.5) Lab ID: 257972018 Collected: 06/03/11 15:05 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
Chrysene	16.0 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	53-70-3	
Fluoranthene	13.2 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	206-44-0	
Fluorene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	86-73-7	
Indeno(1,2,3-cd)pyrene	19.6 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	193-39-5	
Naphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	91-20-3	
Phenanthrene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	85-01-8	
Pyrene	19.6 ug/kg		7.3	1	06/06/11 16:55	06/08/11 19:58	129-00-0	
2-Fluorobiphenyl (S)	77 %		31-131	1	06/06/11 16:55	06/08/11 19:58	321-60-8	
Terphenyl-d14 (S)	81 %		30-133	1	06/06/11 16:55	06/08/11 19:58	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	9.8 %		0.10	1		06/06/11 16:36		

Sample: P2-N-3(4.5) Lab ID: 257972019 Collected: 06/03/11 15:10 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		18.0	1	06/06/11 16:45	06/07/11 21:07		
Motor Oil Range SG	ND mg/kg		72.0	1	06/06/11 16:45	06/07/11 21:07	64742-65-0	
n-Octacosane (S) SG	126 %		50-150	1	06/06/11 16:45	06/07/11 21:07	630-02-4	
o-Terphenyl (S) SG	118 %		50-150	1	06/06/11 16:45	06/07/11 21:07	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	91-57-6	
Acenaphthene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	83-32-9	
Acenaphthylene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	208-96-8	
Anthracene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	120-12-7	
Benzo(a)anthracene	14.7 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	56-55-3	
Benzo(a)pyrene	31.1 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	50-32-8	
Benzo(b)fluoranthene	27.1 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	205-99-2	
Benzo(g,h,i)perylene	27.0 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	191-24-2	
Benzo(k)fluoranthene	14.2 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	207-08-9	
Chrysene	17.9 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	53-70-3	
Fluoranthene	15.8 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	206-44-0	
Fluorene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	86-73-7	
Indeno(1,2,3-cd)pyrene	17.0 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	193-39-5	
Naphthalene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	91-20-3	
Phenanthrene	ND ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	85-01-8	
Pyrene	20.1 ug/kg		7.8	1	06/06/11 16:55	06/08/11 20:14	129-00-0	

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ANALYTICAL RESULTS

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Sample: P2-N-3(4.5) Lab ID: 257972019 Collected: 06/03/11 15:10 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
2-Fluorobiphenyl (S)	79 %		31-131	1	06/06/11 16:55	06/08/11 20:14	321-60-8	
Terphenyl-d14 (S)	79 %		30-133	1	06/06/11 16:55	06/08/11 20:14	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	16.0 %		0.10	1		06/06/11 16:39		

Sample: P2-S-7(4.0) Lab ID: 257972020 Collected: 06/03/11 15:15 Received: 06/04/11 08:50 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS Silica Gel	Analytical Method: NWTPH-Dx Preparation Method: EPA 3546							
Diesel Range SG	ND mg/kg		17.2	1	06/06/11 16:45	06/07/11 21:23		
Motor Oil Range SG	ND mg/kg		68.7	1	06/06/11 16:45	06/07/11 21:23	64742-65-0	
n-Octacosane (S) SG	126 %		50-150	1	06/06/11 16:45	06/07/11 21:23	630-02-4	
o-Terphenyl (S) SG	117 %		50-150	1	06/06/11 16:45	06/07/11 21:23	84-15-1	
8270 MSSV PAH by SIM	Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546							
1-Methylnaphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	90-12-0	
2-Methylnaphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	91-57-6	
Acenaphthene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	83-32-9	
Acenaphthylene	15.1 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	208-96-8	
Anthracene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	120-12-7	
Benzo(a)anthracene	38.1 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	56-55-3	
Benzo(a)pyrene	70.6 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	50-32-8	
Benzo(b)fluoranthene	57.8 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	205-99-2	
Benzo(g,h,i)perylene	40.7 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	191-24-2	
Benzo(k)fluoranthene	32.0 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	207-08-9	
Chrysene	41.0 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	218-01-9	
Dibenz(a,h)anthracene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	53-70-3	
Fluoranthene	35.3 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	206-44-0	
Fluorene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	86-73-7	
Indeno(1,2,3-cd)pyrene	30.8 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	193-39-5	
Naphthalene	ND ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	91-20-3	
Phenanthrene	8.0 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	85-01-8	
Pyrene	53.4 ug/kg		7.3	1	06/06/11 16:55	06/08/11 20:31	129-00-0	
2-Fluorobiphenyl (S)	91 %		31-131	1	06/06/11 16:55	06/08/11 20:31	321-60-8	
Terphenyl-d14 (S)	92 %		30-133	1	06/06/11 16:55	06/08/11 20:31	1718-51-0	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	9.6 %		0.10	1		06/06/11 16:42		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

QC Batch:	OEXT/3819	Analysis Method:	NWTPH-Dx
QC Batch Method:	EPA 3546	Analysis Description:	NWTPH-Dx GCS
Associated Lab Samples: 257972001, 257972002, 257972003, 257972004, 257972005, 257972006, 257972007, 257972008, 257972009, 257972010, 257972011, 257972012, 257972013, 257972014, 257972015, 257972016, 257972017, 257972018, 257972019, 257972020			

METHOD BLANK: 73228

Matrix: Solid

Associated Lab Samples: 257972001, 257972002, 257972003, 257972004, 257972005, 257972006, 257972007, 257972008, 257972009, 257972010, 257972011, 257972012, 257972013, 257972014, 257972015, 257972016, 257972017, 257972018, 257972019, 257972020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Range SG	mg/kg	ND	16.0	06/07/11 15:26	
Motor Oil Range SG	mg/kg	ND	64.0	06/07/11 15:26	
n-Octacosane (S) SG	%	126	50-150	06/07/11 15:26	
o-Terphenyl (S) SG	%	117	50-150	06/07/11 15:26	

LABORATORY CONTROL SAMPLE: 73229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Range SG	mg/kg	500	500	100	56-124	
Motor Oil Range SG	mg/kg	500	498	100	50-150	
n-Octacosane (S) SG	%			124	50-150	
o-Terphenyl (S) SG	%			110	50-150	

SAMPLE DUPLICATE: 73230

Parameter	Units	Result	Dup Result	RPD	Qualifiers
Diesel Range SG	mg/kg	40.8	35.1	15	
Motor Oil Range SG	mg/kg	700	614	13	
n-Octacosane (S) SG	%	133	125	5	
o-Terphenyl (S) SG	%	110	117	7	

SAMPLE DUPLICATE: 73231

Parameter	Units	Result	Dup Result	RPD	Qualifiers
Diesel Range SG	mg/kg	ND	ND		
Motor Oil Range SG	mg/kg	ND	ND		
n-Octacosane (S) SG	%	127	117	6	
o-Terphenyl (S) SG	%	119	111	5	

QUALITY CONTROL DATA

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

QC Batch:	OEXT/3818	Analysis Method:	EPA 8270 by SIM
QC Batch Method:	EPA 3546	Analysis Description:	8270/3546 MSSV PAH by SIM
Associated Lab Samples:	257972001, 257972002, 257972003, 257972004, 257972005, 257972006, 257972007, 257972008, 257972009, 257972010, 257972011, 257972012, 257972013, 257972014, 257972015, 257972016, 257972017, 257972018, 257972019, 257972020		

METHOD BLANK: 73224

Matrix: Solid

Associated Lab Samples: 257972001, 257972002, 257972003, 257972004, 257972005, 257972006, 257972007, 257972008, 257972009, 257972010, 257972011, 257972012, 257972013, 257972014, 257972015, 257972016, 257972017, 257972018, 257972019, 257972020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	ND	6.7	06/08/11 14:58	
2-Methylnaphthalene	ug/kg	ND	6.7	06/08/11 14:58	
Acenaphthene	ug/kg	ND	6.7	06/08/11 14:58	
Acenaphthylene	ug/kg	ND	6.7	06/08/11 14:58	
Anthracene	ug/kg	ND	6.7	06/08/11 14:58	
Benzo(a)anthracene	ug/kg	ND	6.7	06/08/11 14:58	
Benzo(a)pyrene	ug/kg	ND	6.7	06/08/11 14:58	
Benzo(b)fluoranthene	ug/kg	ND	6.7	06/08/11 14:58	
Benzo(g,h,i)perylene	ug/kg	ND	6.7	06/08/11 14:58	
Benzo(k)fluoranthene	ug/kg	ND	6.7	06/08/11 14:58	
Chrysene	ug/kg	ND	6.7	06/08/11 14:58	
Dibenz(a,h)anthracene	ug/kg	ND	6.7	06/08/11 14:58	
Fluoranthene	ug/kg	ND	6.7	06/08/11 14:58	
Fluorene	ug/kg	ND	6.7	06/08/11 14:58	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	6.7	06/08/11 14:58	
Naphthalene	ug/kg	ND	6.7	06/08/11 14:58	
Phenanthrene	ug/kg	ND	6.7	06/08/11 14:58	
Pyrene	ug/kg	ND	6.7	06/08/11 14:58	
2-Fluorobiphenyl (S)	%	80	31-131	06/08/11 14:58	
Terphenyl-d14 (S)	%	87	30-133	06/08/11 14:58	

LABORATORY CONTROL SAMPLE: 73225

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	133	109	82	37-121	
2-Methylnaphthalene	ug/kg	133	111	83	33-132	
Acenaphthene	ug/kg	133	115	86	32-127	
Acenaphthylene	ug/kg	133	114	86	31-134	
Anthracene	ug/kg	133	117	87	42-135	
Benzo(a)anthracene	ug/kg	133	132	99	43-139	
Benzo(a)pyrene	ug/kg	133	132	99	44-144	
Benzo(b)fluoranthene	ug/kg	133	134	100	42-144	
Benzo(g,h,i)perylene	ug/kg	133	126	94	46-136	
Benzo(k)fluoranthene	ug/kg	133	124	93	45-147	
Chrysene	ug/kg	133	121	91	42-144	
Dibenz(a,h)anthracene	ug/kg	133	127	95	48-142	
Fluoranthene	ug/kg	133	115	87	44-143	
Fluorene	ug/kg	133	114	86	32-146	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

LABORATORY CONTROL SAMPLE: 73225

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Indeno(1,2,3-cd)pyrene	ug/kg	133	127	95	47-140	
Naphthalene	ug/kg	133	108	81	35-118	
Phenanthrene	ug/kg	133	120	90	42-131	
Pyrene	ug/kg	133	123	92	47-136	
2-Fluorobiphenyl (S)	%			85	31-131	
Terphenyl-d14 (S)	%			93	30-133	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 73226 73227

Parameter	Units	257972001 Result	MS Spike	MSD Spike	MS	MSD	MS	MSD	% Rec	RPD	Qual
			Conc.	Conc.	Result	Result	% Rec	% Rec	Limits		
1-Methylnaphthalene	ug/kg	ND	143	143	92.5	76.7	64	53	31-123	19	
2-Methylnaphthalene	ug/kg	ND	143	143	94.2	77.6	65	53	15-146	19	
Acenaphthene	ug/kg	ND	143	143	93.2	81.4	64	55	19-141	14	
Acenaphthylene	ug/kg	ND	143	143	98.6	84.6	66	56	30-142	15	
Anthracene	ug/kg	ND	143	143	96.8	83.4	64	54	38-137	15	
Benzo(a)anthracene	ug/kg	28.8	143	143	130	125	71	67	37-143	4	
Benzo(a)pyrene	ug/kg	48.1	143	143	139	195	64	103	33-147	34 D6	
Benzo(b)fluoranthene	ug/kg	63.0	143	143	128	139	46	53	25-156	8	
Benzo(g,h,i)perylene	ug/kg	33.3	143	143	75.4	88.3	30	38	26-142	16	
Benzo(k)fluoranthene	ug/kg	33.3	143	143	161	157	90	86	35-142	3	
Chrysene	ug/kg	65.8	143	143	150	177	59	77	23-150	16	
Dibenz(a,h)anthracene	ug/kg	8.6	143	143	52.6	71.1	31	44	41-140	30 D6,M1	
Fluoranthene	ug/kg	38.6	143	143	144	132	74	65	25-155	8	
Fluorene	ug/kg	ND	143	143	97.8	79.8	67	54	33-152	20 D6	
Indeno(1,2,3-cd)pyrene	ug/kg	22.5	143	143	66.4	90.0	31	47	36-139	30 D6,M1	
Naphthalene	ug/kg	ND	143	143	93.2	78.8	61	50	25-121	17	
Phenanthrene	ug/kg	16.6	143	143	106	104	63	61	29-141	1	
Pyrene	ug/kg	54.4	143	143	157	159	72	73	36-145	1	
2-Fluorobiphenyl (S)	%						64	54	31-131		
Terphenyl-d14 (S)	%						66	59	30-133		

QUALITY CONTROL DATA

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

QC Batch:	PMST/1698	Analysis Method:	ASTM D2974-87
QC Batch Method:	ASTM D2974-87	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	257972001, 257972002, 257972003, 257972004, 257972005, 257972006, 257972007, 257972008, 257972009, 257972010, 257972011, 257972012, 257972013, 257972014, 257972015, 257972016, 257972017, 257972018, 257972019, 257972020		

SAMPLE DUPLICATE: 73232

Parameter	Units	257972001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	9.0	8.6	5	

SAMPLE DUPLICATE: 73233

Parameter	Units	257972019 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	16.0	16.0	.09	

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QUALIFIERS

Project: T4S1-Stockpile sampling1862-00
Pace Project No.: 257972

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel Clean-Up

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-S Pace Analytical Services - Seattle

ANALYTE QUALIFIERS

D6 The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: T4S1-Stockpile sampling1862-00

Pace Project No.: 257972

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
257972001	W-5(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972002	W-6(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972003	W-3(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972004	W-9(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972005	W-1(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972006	W-7(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972007	W-2(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972008	W-4(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972009	W-8(4.0)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972010	W-10(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972011	P2-S-10(4.0)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972012	P2-S-9(4.0)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972013	P2-N-1(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972014	P2-N-6(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972015	P2-S-8(4.0)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972016	P2-N-4(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972017	P2-N-5(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972018	P2-N-2(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972019	P2-N-3(4.5)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972020	P2-S-7(4.0)	EPA 3546	OEXT/3819	NWTPH-Dx	GCSV/2567
257972001	W-5(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972002	W-6(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972003	W-3(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972004	W-9(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972005	W-1(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972006	W-7(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972007	W-2(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972008	W-4(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972009	W-8(4.0)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972010	W-10(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972011	P2-S-10(4.0)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972012	P2-S-9(4.0)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972013	P2-N-1(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972014	P2-N-6(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972015	P2-S-8(4.0)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972016	P2-N-4(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972017	P2-N-5(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972018	P2-N-2(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972019	P2-N-3(4.5)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972020	P2-S-7(4.0)	EPA 3546	OEXT/3818	EPA 8270 by SIM	MSSV/1655
257972001	W-5(4.5)	ASTM D2974-87	PMST/1698		
257972002	W-6(4.5)	ASTM D2974-87	PMST/1698		
257972003	W-3(4.5)	ASTM D2974-87	PMST/1698		
257972004	W-9(4.5)	ASTM D2974-87	PMST/1698		
257972005	W-1(4.5)	ASTM D2974-87	PMST/1698		
257972006	W-7(4.5)	ASTM D2974-87	PMST/1698		
257972007	W-2(4.5)	ASTM D2974-87	PMST/1698		
257972008	W-4(4.5)	ASTM D2974-87	PMST/1698		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: T4S1-Stockpile sampling1862-00
 Pace Project No.: 257972

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
257972009	W-8(4.0)	ASTM D2974-87	PMST/1698		
257972010	W-10(4.5)	ASTM D2974-87	PMST/1698		
257972011	P2-S-10(4.0)	ASTM D2974-87	PMST/1698		
257972012	P2-S-9(4.0)	ASTM D2974-87	PMST/1698		
257972013	P2-N-1(4.5)	ASTM D2974-87	PMST/1698		
257972014	P2-N-6(4.5)	ASTM D2974-87	PMST/1698		
257972015	P2-S-8(4.0)	ASTM D2974-87	PMST/1698		
257972016	P2-N-4(4.5)	ASTM D2974-87	PMST/1698		
257972017	P2-N-5(4.5)	ASTM D2974-87	PMST/1698		
257972018	P2-N-2(4.5)	ASTM D2974-87	PMST/1698		
257972019	P2-N-3(4.5)	ASTM D2974-87	PMST/1698		
257972020	P2-S-7(4.0)	ASTM D2974-87	PMST/1698		

Date: 06/13/2011 02:18 PM

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CHAIN OF CUSTODY RECORD

Project Manager: Christopher Sheridan
Project Name: Port of Portland - T4S1 Stockpile sampling
Project Number: 1862-00
Sampler Name: M. Whitson

Client Name: Ash Creek Associates
Address: 3015 SW First Ave
City/State/Zip: Portland, OR 97201

Telephone Number: 503.924.4704
Fax No.: 503.943.6357

2 5 7 9 7 2

Analytical Lab: Pace

Report To: csheridan@ashcreekassociates.com

Page: 1 **of** 2

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative		Matrix	Analyze For:		RUSH TAT (Pre-Schedule)											
							Ice	HNO ₃ (Red Label) HCl (Blue Label)		NaOH (Orange Label)	H ₂ SO ₄ , Plastic (Yellow Label)	H ₂ SO ₄ , Glass (Yellow Label)	None (Black Label)	Other (Specify)	Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):			
W-5 (4.5)	6/3/11	1015	2	x		x								x	X X							x	
W-6 (4.5)	6/3/11	1030	2	x		x								x								x	
W-3 (4.5)	6/3/11	1050	2	x		x								x								x	
W-9 (4.5)	6/3/11	1105	2	x		x								x								x	
W-1 (4.5)	6/3/11	1120	2	x		x								x								x	
W-7 (4.5)	6/3/11	1230	2	x		x								x								x	
W-2 (4.5)	6/3/11	1240	2	x		x								x								x	
W-4 (4.5)	6/3/11	1250	2	x		x								x								x	
W-8 (4.0)	6/3/11	1255	2	x		x								x								x	
W-10 (4.5)	6/3/11	1300	2	x		x								x								x	

Special Instructions:

Method of Shipment: Courier

Relinquished by: Name/Company <i>Christopher Sheridan</i>	Date 6/3/2011	Time	Received by: Name/Company	Date	Time
Relinquished by: Name/Company <i>PCS</i>	Date 6/4/11	Time 0850	Received by: Name/Company <i>Jyothi Swan /PACE</i>	Date 6/4/11	Time 0850
Relinquished by: Name/Company	Date	Time	Received by: Name/Company	Date	Time
Relinquished by: Name/Company	Date	Time	Received by: Name/Company	Date	Time

Laboratory Comments:

Temperature Upon Receipt: 4.9°C
VOCs Free of Headspace? Y N



CHAIN OF CUSTODY RECORD

Client Name: Ash Creek Associates
 Address: 3015 SW First Ave
 City/State/Zip: Portland, OR 97201

Telephone Number: 503.924.4704
 Fax No.: 503.943.6357

2 5 7 9 7 2

Project Manager: Christopher Sheridan

Project Name: Port of Portland - T4S1 Stockpile sampling

Project Number: 1862-00

Sampler Name: M. Whitson

Analytical Lab: Pace

Report To: csheridan@ashcreekassociates.com

Page: 12 of 12

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Ice	Preservative		Matrix	Analyze For:		RUSH TAT (Pre-Schedule)	
								HNO ₃ (Red Label)	HCl (Blue Label)		Other (specify):			
P2-S-10 (4.0)	6/3/11	1400	2	x		x				x	X	X		x
P2-S-9 (4.0)	6/3/11	1405	2	x		x				x				x
P2-N-1 (4.5)	6/3/11	1410	2	x		x				x				x
P2-N-6 (4.5)	6/3/11	1415	2	x		x				x				x
P2-S-8 (4.0)	6/3/11	1420	2	x		x				x				x
P2-N-4 (4.5)	6/3/11	1455	2	x		x				x				x
P2-N-5 (4.5)	6/3/11	1500	2	x		x				x				x
P2-N-2 (4.5)	6/3/11	1505	2	x		x				x				x
P2-N-3 (4.5)	6/3/11	1510	2	x		x				x				x
P2-S-7 (4.0)	6/3/11	1515	2	x		x				x	V	V		x

Special Instructions:

Method of Shipment:

Relinquished by: Name/Company <i>Christopher Sheridan/ACA</i>	Date 6/3/2011	Time	Received by: Name/Company	Date	Time
Relinquished by: Name/Company <i>PCS</i>	Date 6/4/11	Time 0850	Received by: Name/Company <i>Tyler Sway/PACE</i>	Date 6/4/11	Time 0850
Relinquished by: Name/Company	Date	Time	Received by: Name/Company	Date	Time
Relinquished by: Name/Company	Date	Time	Received by: Name/Company	Date	Time

Laboratory Comments:

Temperature Upon Receipt:
VOCs Free of Headspace?

4.9°C
Y N

Sample Container Count

CLIENT: Ashcreek

COC PAGE 1 of 2

COC ID# _____



257972

Sample Line

Item	VG9H	AG1H	AG1U	BG1H	BP1U	BP2U	BP3U	BP2N	BP2S	WG FU	WG KU	Comments
1										2		
2										1		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												Trip Blank? <u>N</u> o

AG1H	1 liter HCL amber glass		BP2S	500mL H2SO4 plastic		JGFU	4oz unpreserved amber wide
AG1U	1liter unpreserved amber glass		BP2U	500mL unpreserved plastic		R	terra core kit
AG2S	500mL H2SO4 amber glass		BP2Z	500mL NaOH, Zn Ac		U	Summa Can
AG2U	500mL unpreserved amber glass		BP3C	250mL NaOH plastic		VG9H	40mL HCL clear vial
AG3S	250mL H2SO4 amber glass		BP3N	250mL HNO3 plastic		VG9T	40mL Na Thio. clear vial
BG1H	1 liter HCL clear glass		BP3S	250mL H2SO4 plastic		VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass		BP3U	250mL unpreserved plastic		VG9W	40mL glass vial preweighted (EPA 5035)
BP1N	1 liter HNO3 plastic		DG9B	40mL Na Bisulfate amber vial		VSG	Headspace septa vial & HCL
BP1S	1 liter H2SO4 plastic		DG9H	40mL HCL amber voa vial		WG FU	4oz clear soil jar
BP1U	1 liter unpreserved plastic		DG9M	40mL MeOH clear vial		WG FX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac		DG9T	40mL Na Thio amber vial		ZPLC	Ziploc Bag
BP2N	500mL HNO3 plastic		DG9U	40mL unpreserved amber vial			
BP2O	500mL NaOH plastic		I	Wipe/Swab			

Sample Container Count

CLIENT: Ashcreek

COC PAGE 2 of 2

COC ID# _____



257972

Sample Line

Item	VG9H	AG1H	AG1U	BG1H	BP1U	BP2U	BP3U	BP2N	BP2S	WG FU	WG KU	Comments
1									2			
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												Trip Blank? <i>kb</i>

AG1H	1 liter HCL amber glass		BP2S	500mL H2SO4 plastic		JGFU	4oz unpreserved amber wide
AG1U	1liter unpreserved amber glass		BP2U	500mL unpreserved plastic		R	terra core kit
AG2S	500mL H2SO4 amber glass		BP2Z	500mL NaOH, Zn Ac		U	Summa Can
AG2U	500mL unpreserved amber glass		BP3C	250mL NaOH plastic		VG9H	40mL HCL clear vial
AG3S	250mL H2SO4 amber glass		BP3N	250mL HNO3 plastic		VG9T	40mL Na Thio. clear vial
BG1H	1 liter HCL clear glass		BP3S	250mL H2SO4 plastic		VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass		BP3U	250mL unpreserved plastic		VG9W	40mL glass vial preweighted (EPA 5035)
BP1N	1 liter HNO3 plastic		DG9B	40mL Na Bisulfate amber vial		VSG	Headspace septa vial & HCL
BP1S	1 liter H2SO4 plastic		DG9H	40mL HCL amber voa vial		WG FU	4oz clear soil jar
BP1U	1 liter unpreserved plastic		DG9M	40mL MeOH clear vial		WGFX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac		DG9T	40mL Na Thio amber vial		ZPLC	Ziploc Bag
BP2N	500mL HNO3 plastic		DG9U	40mL unpreserved amber vial			
BP2O	500mL NaOH plastic		I	Wipe/Swab			

Sample Condition Upon Receipt

Client Name: Ashcreek Project # 257972

Courier: FedEx UPS USPS Client Commercial Pace Other 125 PCS
 Tracking #: 7351538

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags None Other _____ Temp. Blank Yes No _____

Thermometer Used 132013 or 101731962 or 226099 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temperature 4.9°C Biological Tissue is Frozen: Yes No Date and Initials of person examining contents: NS 6/4/11

Temp should be above freezing ≤ 6°C Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7. <u>5 day.</u>
Follow Up / Hold Analysis Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
-Pace Containers Used:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
-Includes date/time/ID/Analysis Matrix:	<u>Soil</u>	
All containers needing preservation have been checked:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Exceptions: VOA, coliform, TOC, O&G	Initial when completed	Lot # of added preservative
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	15.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blanks Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	17.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: JENNI GROSS Date: 10/16/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Attachment D

RME Concentrations and ProUCL Results

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	\STORAGE\Projects\Port of Portland\Env Services Contract No. 320\1862-00 T4S1 Soil Pile Samp
Full Precision	OFF
Confidence Coefficient	90%
Number of Bootstrap Operations	2000

Acenaphthene

General Statistics

Number of Valid Data	10	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	9
		Percent Non-Detects	90.00%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Acenaphthene was not processed!

Acenphthylene

General Statistics

Number of Valid Data	10	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	6
		Percent Non-Detects	60.00%

Raw Statistics

Minimum Detected	10.2
Maximum Detected	15.1
Mean of Detected	11.95
SD of Detected	2.161
Minimum Non-Detect	7.1
Maximum Non-Detect	7.8

Log-transformed Statistics

Minimum Detected	2.322
Maximum Detected	2.715
Mean of Detected	2.469
SD of Detected	0.17
Minimum Non-Detect	1.96
Maximum Non-Detect	2.054

Note: Data have multiple DLs - Use of KM Method is recommended

Number treated as Non-Detect 6

For all methods (except KM, DL/2, and ROS Methods),

Number treated as Detected 4

Observations < Largest ND are treated as NDs

Single DL Non-Detect Percentage 60.00%

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.834
5% Shapiro Wilk Critical Value	0.748

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.864
5% Shapiro Wilk Critical Value	0.748

Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution			
DL/2 Substitution Method		DL/2 Substitution Method			
Mean	6.965	Mean	1.763		
SD	4.469	SD	0.617		
90% DL/2 (t) UCL	8.92	90% H-Stat (DL/2) UCL	10.02		
Maximum Likelihood Estimate(MLE) Method		Log ROS Method			
Mean	6.873	Mean in Log Scale	2.124		
SD	4.957	SD in Log Scale	0.323		
90% MLE (t) UCL	9.041	Mean in Original Scale	8.785		
90% MLE (Tiku) UCL	9.903	SD in Original Scale	3.042		
		90% t UCL	10.11		
		90% Percentile Bootstrap UCL	10.1		
		90% BCA Bootstrap UCL	10.18		
		90% H UCL	10.32		
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only			
k star (bias corrected)	11.25	Data appear Normal at 5% Significance Level			
Theta Star	1.062	Nonparametric Statistics			
nu star	90	Kaplan-Meier (KM) Method			
A-D Test Statistic	0.478	Mean			
5% A-D Critical Value	0.656	SD			
K-S Test Statistic	0.656	SE of Mean			
5% K-S Critical Value	0.394	90% KM (t) UCL			
Data appear Gamma Distributed at 5% Significance Level		90% KM (z) UCL			
Assuming Gamma Distribution		90% KM (jackknife) UCL			
Gamma ROS Statistics using Extrapolated Data		90% KM (bootstrap t) UCL			
Minimum	1.0000E-6	12.16			
Maximum	15.1	90% KM (BCA) UCL			
Mean	5.364	12.51			
Median	2.922	90% KM (Percentile Bootstrap) UCL			
SD	5.912	11.93			
k star	0.158	90% KM (Chebyshev) UCL			
Theta star	33.94	12.5			
Nu star	3.161	95% KM (Chebyshev) UCL			
AppChi2	0.665	13.23			
90% Gamma Approximate UCL	25.52	97.5% KM (Chebyshev) UCL			
90% Adjusted Gamma UCL	N/A	14.23			
		99% KM (Chebyshev) UCL			
Note: DL/2 is not a recommended method.		16.21			
Anthracene					
General Statistics					
Number of Valid Data	10	Number of Detected Data	1		
Number of Distinct Detected Data	1	Number of Non-Detect Data	9		
		Percent Non-Detects	90.00%		

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Anthracene was not processed!

BaA

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10
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Raw Statistics

Minimum	8	Minimum of Log Data	2.079
Maximum	696	Maximum of Log Data	6.545
Mean	86.12	Mean of log Data	3.175
Median	15.5	SD of log Data	1.269
SD	214.5		
Std. Error of Mean	67.83		
Coefficient of Variation	2.491		
Skewness	3.151		

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.402	Shapiro Wilk Test Statistic	0.699
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.699
Shapiro Wilk Critical Value	0.842

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

90% Student's-t UCL	179.9	90% H-UCL	157
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90% UCLs (Adjusted for Skewness)

90% Adjusted-CLT UCL (Chen-1995)	221.3	90% Chebyshev (MVUE) UCL	107.6
90% Modified-t UCL (Johnson-1978)	191.2	95% Chebyshev (MVUE) UCL	134.9

Assuming Lognormal Distribution

90% H-UCL	157
90% Chebyshev (MVUE) UCL	107.6
95% Chebyshev (MVUE) UCL	134.9
97.5% Chebyshev (MVUE) UCL	172.8

Gamma Distribution Test

k star (bias corrected)	0.414	Data do not follow a Discernable Distribution (0.05)	
Theta Star	207.9	90% CLT UCL	173
MLE of Mean	86.12	90% Jackknife UCL	179.9
MLE of Standard Deviation	133.8	90% Standard Bootstrap UCL	171.1
nu star	8.284	90% Bootstrap-t UCL	1933
Approximate Chi Square Value (.05)	3.681	90% Hall's Bootstrap UCL	1177
Adjusted Level of Significance	0.0724	90% Percentile Bootstrap UCL	156
Adjusted Chi Square Value	3.285	90% BCA Bootstrap UCL	223.4
Anderson-Darling Test Statistic	2.14	90% Chebyshev(Mean, Sd) UCL	289.6
Anderson-Darling 5% Critical Value	0.778	95% Chebyshev(Mean, Sd) UCL	381.8
Kolmogorov-Smirnov Test Statistic	0.405	97.5% Chebyshev(Mean, Sd) UCL	509.7
Kolmogorov-Smirnov 5% Critical Value	0.281		

Data not Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	761		
90% Approximate Gamma UCL		193.8			
90% Adjusted Gamma UCL		217.2			
Potential UCL to Use		Recommendation Provided only for 95% Confidence Coefficient			
<p>Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.</p> <p>These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.</p>					
BaP					
General Statistics					
Number of Valid Observations	10	Number of Distinct Observations	10		
Raw Statistics		Log-transformed Statistics			
Minimum	16.7	Minimum of Log Data	2.815		
Maximum	899	Maximum of Log Data	6.801		
Mean	123	Mean of log Data	3.834		
Median	31.25	SD of log Data	1.134		
SD	273.2				
Std. Error of Mean	86.39				
Coefficient of Variation	2.221				
Skewness	3.139				
Relevant UCL Statistics					
Normal Distribution Test		Lognormal Distribution Test			
Shapiro Wilk Test Statistic	0.421	Shapiro Wilk Test Statistic	0.734		
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution			
90% Student's-t UCL	242.5	90% H-UCL	213.7		
90% UCLs (Adjusted for Skewness)		90% Chebyshev (MVUE) UCL	171.1		
90% Adjusted-CLT UCL (Chen-1995)	295	95% Chebyshev (MVUE) UCL	212.3		
90% Modified-t UCL (Johnson-1978)	256.8	97.5% Chebyshev (MVUE) UCL	269.4		
		99% Chebyshev (MVUE) UCL	381.7		
Gamma Distribution Test		Data Distribution			
k star (bias corrected)	0.506	Data do not follow a Discernable Distribution (0.05)			
Theta Star	243.2				
MLE of Mean	123				
MLE of Standard Deviation	173				
nu star	10.11				
Approximate Chi Square Value (.05)	4.947	Nonparametric Statistics			
Adjusted Level of Significance	0.0724	90% CLT UCL	233.7		
Adjusted Chi Square Value	4.476	90% Jackknife UCL	242.5		
		90% Standard Bootstrap UCL	226.1		
Anderson-Darling Test Statistic	1.904	90% Bootstrap-t UCL	1752		
Anderson-Darling 5% Critical Value	0.767	90% Hall's Bootstrap UCL	1036		
Kolmogorov-Smirnov Test Statistic	0.386	90% Percentile Bootstrap UCL	213.2		

Kolmogorov-Smirnov 5% Critical Value	0.278	90% BCA Bootstrap UCL	296.1		
Data not Gamma Distributed at 5% Significance Level		90% Chebyshev(Mean, Sd) UCL	382.2		
		95% Chebyshev(Mean, Sd) UCL	499.6		
		97.5% Chebyshev(Mean, Sd) UCL	662.5		
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	982.6		
90% Approximate Gamma UCL	251.5				
90% Adjusted Gamma UCL	278				
Potential UCL to Use		Recommendation Provided only for 95% Confidence Coefficient			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

BbF

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	15.6	Minimum of Log Data	2.747
Maximum	1110	Maximum of Log Data	7.012
Mean	139.1	Mean of log Data	3.718
Median	26.7	SD of log Data	1.23
SD	341.4		
Std. Error of Mean	108		
Coefficient of Variation	2.454		
Skewness	3.153		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.401	Shapiro Wilk Test Statistic	0.683
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
90% Student's-t UCL	288.4	90% H-UCL	243.3
90% UCLs (Adjusted for Skewness)		90% Chebyshev (MVUE) UCL	175
90% Adjusted-CLT UCL (Chen-1995)	354.3	95% Chebyshev (MVUE) UCL	218.7
90% Modified-t UCL (Johnson-1978)	306.4	97.5% Chebyshev (MVUE) UCL	279.5
		99% Chebyshev (MVUE) UCL	398.7
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.43	Data do not follow a Discernable Distribution (0.05)	
Theta Star	323.6	Nonparametric Statistics	
MLE of Mean	139.1	90% CLT UCL	277.5
MLE of Standard Deviation	212.2	90% Jackknife UCL	288.4
nu star	8.598		
Approximate Chi Square Value (.05)	3.894		
Adjusted Level of Significance	0.0724		
Adjusted Chi Square Value	3.484		

Anderson-Darling Test Statistic	2.175			90% Standard Bootstrap UCL		266.2	
Anderson-Darling 5% Critical Value	0.775			90% Bootstrap-t UCL		3145	
Kolmogorov-Smirnov Test Statistic	0.427			90% Hall's Bootstrap UCL		1781	
Kolmogorov-Smirnov 5% Critical Value	0.28			90% Percentile Bootstrap UCL		251.1	
Data not Gamma Distributed at 5% Significance Level				90% BCA Bootstrap UCL		357	
Assuming Gamma Distribution				90% Chebyshev(Mean, Sd) UCL		463	
90% Approximate Gamma UCL	307.2			95% Chebyshev(Mean, Sd) UCL		609.7	
90% Adjusted Gamma UCL	343.3			97.5% Chebyshev(Mean, Sd) UCL		813.3	
Potential UCL to Use				99% Chebyshev(Mean, Sd) UCL		1213	
				Recommendation Provided only for 95% Confidence Coefficient			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

BghiP

General Statistics

Number of Valid Observations 10 | Number of Distinct Observations 10

Raw Statistics

Minimum	17.2	Minimum of Log Data	2.845
Maximum	456	Maximum of Log Data	6.122
Mean	82.27	Mean of log Data	3.829
Median	36.2	SD of log Data	0.937
SD	133.7		
Std. Error of Mean	42.28		
Coefficient of Variation	1.625		
Skewness	2.971		

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.503
Shapiro Wilk Critical Value	0.842

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.794
Shapiro Wilk Critical Value	0.842

Data not Normal at 5% Significance Level

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

90% Student's-t UCI 140.7

Assuming Lognormal Distribution

90% H-UCl 137

90% UCLs (Adjusted for Skewness)

90% Adjusted-CLT UCL (Chen-1995) 164.8

95% Chebyshev (MVUE) UCL	158.6
97.5% Chebyshev (MVUE) UCL	198
99% Chebyshev (MVUE) UCL	275.4

Gamma Distribution Test

k star (bias corrected)	0.763
Theta Star	107.8
MLE of Mean	82.27
MLE of Standard Deviation	94.19

Data Distribution

Data do not follow a Discernable Distribution (0.05)

nu star	15.26					
Approximate Chi Square Value (.05)	8.744					
Adjusted Level of Significance	0.0724					
Adjusted Chi Square Value	8.093					
Anderson-Darling Test Statistic	1.474					
Anderson-Darling 5% Critical Value	0.748					
Kolmogorov-Smirnov Test Statistic	0.368					
Kolmogorov-Smirnov 5% Critical Value	0.274					
Data not Gamma Distributed at 5% Significance Level						
Assuming Gamma Distribution						
90% Approximate Gamma UCL	143.6					
90% Adjusted Gamma UCL	155.1					

Potential UCL to Use Recommendation Provided only for 95% Confidence Coefficient

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

BkF

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics

Log-transformed Statistics

Minimum Detected	8.7	Minimum Detected	2.163
Maximum Detected	476	Maximum Detected	6.165
Mean of Detected	68.44	Mean of Detected	3.135
SD of Detected	153.1	SD of Detected	1.225
Minimum Non-Detect	7.1	Minimum Non-Detect	1.96
Maximum Non-Detect	7.1	Maximum Non-Detect	1.96

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.438	Shapiro Wilk Test Statistic	0.734
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution			Assuming Lognormal Distribution		
DL/2 Substitution Method			DL/2 Substitution Method		
Mean	61.96		Mean	2.948	
SD	145.8		SD	1.298	
90% DL/2 (t) UCL	125.7		90% H-Stat (DL/2) UCL	135.5	
Maximum Likelihood Estimate(MLE) Method			Log ROS Method		
Mean	52.01		Mean in Log Scale	2.871	
SD	147.7		SD in Log Scale	1.425	
90% MLE (t) UCL	116.6		Mean in Original Scale	61.76	
90% MLE (Tiku) UCL	111.7		SD in Original Scale	145.8	
			90% t UCL	125.5	
			90% Percentile Bootstrap UCL	111.3	
			90% BCA Bootstrap UCL	154.1	
			90% H UCL	182.6	
Gamma Distribution Test with Detected Values Only			Data Distribution Test with Detected Values Only		
k star (bias corrected)	0.454		Data do not follow a Discernable Distribution (0.05)		
Theta Star	150.6				
nu star	8.179				
A-D Test Statistic	1.719		Nonparametric Statistics		
5% A-D Critical Value	0.765		Kaplan-Meier (KM) Method		
K-S Test Statistic	0.765		Mean	62.47	
5% K-S Critical Value	0.293		SD	138.1	
Data not Gamma Distributed at 5% Significance Level			SE of Mean	46.31	
			90% KM (t) UCL	126.5	
Assuming Gamma Distribution			90% KM (z) UCL	121.8	
Gamma ROS Statistics using Extrapolated Data			90% KM (jackknife) UCL	126.1	
Minimum	1.0000E-6		90% KM (bootstrap t) UCL	992.1	
Maximum	476		90% KM (BCA) UCL	111.5	
Mean	61.6		90% KM (Percentile Bootstrap) UCL	110.7	
Median	14.15		90% KM (Chebyshev) UCL	201.4	
SD	145.9		95% KM (Chebyshev) UCL	264.3	
k star	0.251		97.5% KM (Chebyshev) UCL	351.7	
Theta star	245.8		99% KM (Chebyshev) UCL	523.2	
Nu star	5.013				
AppChi2	1.62		Potential UCL to Use		
90% Gamma Approximate UCL	190.6		Recommendation Provided only		
90% Adjusted Gamma UCL	223.6		for 95% Confidence Coefficient		

Note: DL/2 is not a recommended method.

C

General Statistics					
Number of Valid Observations		10	Number of Distinct Observations		10
Raw Statistics		Log-transformed Statistics		Transformed Statistics	
Minimum	8.7	Mean of Log Data	2.163	Mean of Log Data	2.163
Maximum	660	Maximum of Log Data	6.492	Maximum of Log Data	6.492
Mean	85.08	Mean of log Data	3.311	Mean of log Data	3.311

	Median	18.45		SD of log Data	1.201
	SD	202.2			
	Std. Error of Mean	63.95			
	Coefficient of Variation	2.377			
	Skewness	3.149			
Relevant UCL Statistics					
Normal Distribution Test			Lognormal Distribution Test		
	Shapiro Wilk Test Statistic	0.408		Shapiro Wilk Test Statistic	0.72
	Shapiro Wilk Critical Value	0.842		Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
	90% Student's-t UCL	173.5		90% H-UCL	150.3
90% UCLs (Adjusted for Skewness)			90% Chebyshev (MVUE) UCL		
	90% Adjusted-CLT UCL (Chen-1995)	212.5		95% Chebyshev (MVUE) UCL	139.4
	90% Modified-t UCL (Johnson-1978)	184.1		97.5% Chebyshev (MVUE) UCL	177.8
				99% Chebyshev (MVUE) UCL	253.2
Gamma Distribution Test			Data Distribution		
	k star (bias corrected)	0.453		Data do not follow a Discernable Distribution (0.05)	
	Theta Star	187.7		Nonparametric Statistics	
	MLE of Mean	85.08		90% CLT UCL	167
	MLE of Standard Deviation	126.4		90% Jackknife UCL	173.5
	nu star	9.065		90% Standard Bootstrap UCL	161.5
	Approximate Chi Square Value (.05)	4.213		90% Bootstrap-t UCL	1676
	Adjusted Level of Significance	0.0724		90% Hall's Bootstrap UCL	854.3
	Adjusted Chi Square Value	3.784		90% Percentile Bootstrap UCL	152.1
	Anderson-Darling Test Statistic	2.06		90% BCA Bootstrap UCL	213.4
	Anderson-Darling 5% Critical Value	0.773		90% Chebyshev(Mean, Sd) UCL	276.9
	Kolmogorov-Smirnov Test Statistic	0.406		95% Chebyshev(Mean, Sd) UCL	363.8
	Kolmogorov-Smirnov 5% Critical Value	0.28		97.5% Chebyshev(Mean, Sd) UCL	484.5
Data not Gamma Distributed at 5% Significance Level				99% Chebyshev(Mean, Sd) UCL	721.4
Assuming Gamma Distribution			Potential UCL to Use		
	90% Approximate Gamma UCL	183		Recommendation Provided only for 95% Confidence Coefficient	
	90% Adjusted Gamma UCL	203.8			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.					
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					
Dibenzo					
General Statistics					
Number of Valid Data	10		Number of Detected Data	3	
Number of Distinct Detected Data	3		Number of Non-Detect Data	7	

Percent Non-Detects 70.00%

Raw Statistics**Log-transformed Statistics**

Minimum Detected	7.9
Maximum Detected	133
Mean of Detected	52.97
SD of Detected	69.49
Minimum Non-Detect	7.1
Maximum Non-Detect	7.8

Minimum Detected	2.067
Maximum Detected	4.89
Mean of Detected	3.283
SD of Detected	1.452
Minimum Non-Detect	1.96
Maximum Non-Detect	2.054

Note: Data have multiple DLs - Use of KM Method is recommended

Number treated as Non-Detect 7

For all methods (except KM, DL/2, and ROS Methods),

Number treated as Detected 3

Observations < Largest ND are treated as NDs

Single DL Non-Detect Percentage 70.00%

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics**Normal Distribution Test with Detected Values Only****Lognormal Distribution Test with Detected Values Only**

Shapiro Wilk Test Statistic 0.81

Shapiro Wilk Test Statistic 0.945

5% Shapiro Wilk Critical Value 0.767

5% Shapiro Wilk Critical Value 0.767

Data appear Normal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution**Assuming Lognormal Distribution****DL/2 Substitution Method****DL/2 Substitution Method**

Mean 18.45

Mean 1.891

SD 40.51

SD 1.18

90% DL/2 (t) UCL 36.16

90% H-Stat (DL/2) UCL 34.35

Maximum Likelihood Estimate(MLE) Method**Log ROS Method**

MLE yields a negative mean

Mean in Log Scale -1.061

SD in Log Scale 3.291

Mean in Original Scale 15.97

SD in Original Scale 41.53

90% t UCL 34.13

90% Percentile Bootstrap UCL 31.02

90% BCA Bootstrap UCL 43.61

90% H-UCL 47786

Gamma Distribution Test with Detected Values Only**Data Distribution Test with Detected Values Only**

k star (bias corrected) N/A

Data appear Normal at 5% Significance Level

Theta Star N/A

nu star N/A

A-D Test Statistic N/A

Nonparametric Statistics

5% A-D Critical Value N/A

Kaplan-Meier (KM) Method

K-S Test Statistic	N/A	Mean	21.42
5% K-S Critical Value	N/A	SD	37.32
Data not Gamma Distributed at 5% Significance Level		SE of Mean	14.45
		90% KM (t) UCL	41.41
Assuming Gamma Distribution		90% KM (z) UCL	39.94
Gamma ROS Statistics using Extrapolated Data		90% KM (Jackknife) UCL	35.14
Minimum	N/A	90% KM (bootstrap t) UCL	134.1
Maximum	N/A	90% KM (BCA) UCL	52.5
Mean	N/A	90% KM (Percentile Bootstrap) UCL	133
Median	N/A	90% KM (Chebyshev) UCL	64.78
SD	N/A	95% KM (Chebyshev) UCL	84.42
k star	N/A	97.5% KM (Chebyshev) UCL	111.7
Theta star	N/A	99% KM (Chebyshev) UCL	165.2
Nu star	N/A		
AppChi2	N/A	Potential UCL to Use	
90% Gamma Approximate UCL	N/A	Recommendation Provided only	
90% Adjusted Gamma UCL	N/A	for 95% Confidence Coefficient	

Note: DL/2 is not a recommended method.

Fluoranthene

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	7.8	Minimum of Log Data	2.054
Maximum	823	Maximum of Log Data	6.713
Mean	98.6	Mean of log Data	3.186
Median	14.8	SD of log Data	1.316
SD	254.7		
Std. Error of Mean	80.53		
Coefficient of Variation	2.583		
Skewness	3.156		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.395	Shapiro Wilk Test Statistic	0.678
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
90% Student's-t UCL	210	90% H-UCL	181.2
90% UCLs (Adjusted for Skewness)		90% Chebyshev (MVUE) UCL	116.7
90% Adjusted-CLT UCL (Chen-1995)	259.2	95% Chebyshev (MVUE) UCL	146.8
90% Modified-t UCL (Johnson-1978)	223.4	97.5% Chebyshev (MVUE) UCL	188.5
99% Chebyshev (MVUE) UCL	270.5	99% Chebyshev (MVUE) UCL	
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.388	Data do not follow a Discernable Distribution (0.05)	
Theta Star	254.4		
MLE of Mean	98.6		

MLE of Standard Deviation		158.4				
nu star		7.751				
Approximate Chi Square Value (.05)		3.325			Nonparametric Statistics	
Adjusted Level of Significance		0.0724			90% CLT UCL	201.8
Adjusted Chi Square Value		2.952			90% Jackknife UCL	210
					90% Standard Bootstrap UCL	199.6
Anderson-Darling Test Statistic		2.258			90% Bootstrap-t UCL	2807
Anderson-Darling 5% Critical Value		0.785			90% Hall's Bootstrap UCL	1594
Kolmogorov-Smirnov Test Statistic		0.431			90% Percentile Bootstrap UCL	181.6
Kolmogorov-Smirnov 5% Critical Value		0.282			90% BCA Bootstrap UCL	260.2
Data not Gamma Distributed at 5% Significance Level					90% Chebyshev(Mean, Sd) UCL	340.2
					95% Chebyshev(Mean, Sd) UCL	449.6
					97.5% Chebyshev(Mean, Sd) UCL	601.5
Assuming Gamma Distribution					99% Chebyshev(Mean, Sd) UCL	899.9
90% Approximate Gamma UCL						
90% Adjusted Gamma UCL						
Potential UCL to Use					Recommendation Provided only for 95% Confidence Coefficient	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fluorene

General Statistics

Number of Valid Data	10	Number of Detected Data	1
Number of Distinct Detected Data	1	Number of Non-Detect Data	9

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BT).

The data set for variable Fluorene was not processed!

Indeno

General Statistics

Number of Valid Observations | 10 | Number of Distinct Observations | 10 |

Raw Statistics

Minimum	9.6
Maximum	436
Mean	67.99
Median	23.3
SD	130.6
Error of Mean	41.2
of Variation	1.92
Skewness	3.05

Log-transformed Statistics

Minimum of Log Data	2.262
Maximum of Log Data	6.078
Mean of log Data	3.426
SD of log Data	1.082

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.473
Shapiro Wilk Critical Value	0.842

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical Value	0.842

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

90% Student's-t UCL	125.1
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90% UCLs (Adjusted for Skewness)

90% Adjusted-CLT UCL (Chen-1995)	149.4
90% Modified-t UCL (Johnson-1978)	131.7

Assuming Lognormal Distribution

90% H-UCL	125.6
90% Chebyshev (MVUE) UCL	105.9
95% Chebyshev (MVUE) UCL	130.8
97.5% Chebyshev (MVUE) UCL	165.4
99% Chebyshev (MVUE) UCL	233.2

Gamma Distribution Test

k star (bias corrected)	0.595
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Theta Star	114.3
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MLE of Mean	67.99
-------------	-------

MLE of Standard Deviation	88.17
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nu star	11.89
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Approximate Chi Square Value (.05)	6.226
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Adjusted Level of Significance	0.0724
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Adjusted Chi Square Value	5.689
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Anderson-Darling Test Statistic	1.477
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Anderson-Darling 5% Critical Value	0.757
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Kolmogorov-Smirnov Test Statistic	0.368
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Kolmogorov-Smirnov 5% Critical Value	0.276
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Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

90% CLT UCL	120.9
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90% Jackknife UCL	125.1
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90% Standard Bootstrap UCL	119.1
----------------------------	-------

90% Bootstrap-t UCL	757.7
---------------------	-------

90% Hall's Bootstrap UCL	411.7
--------------------------	-------

90% Percentile Bootstrap UCL	113.9
------------------------------	-------

90% BCA Bootstrap UCL	153.3
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90% Chebyshev(Mean, Sd) UCL	191.9
-----------------------------	-------

95% Chebyshev(Mean, Sd) UCL	248
-----------------------------	-----

97.5% Chebyshev(Mean, Sd) UCL	325.9
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99% Chebyshev(Mean, Sd) UCL	478.8
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Assuming Gamma Distribution

90% Approximate Gamma UCL	129.9
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90% Adjusted Gamma UCL	142.2
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Potential UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Naph

General Statistics

Number of Valid Data	10
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Number of Detected Data	1
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Number of Distinct Detected Data	1
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Number of Non-Detect Data	9
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Percent Non-Detects	90.00%
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Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set! suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B

The data set for variable Naph was not processed!

Phen

General Statistics

Number of Valid Data	10	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	7
		Percent Non-Detects	70.00%

Raw Statistics

Minimum Detected	8	Minimum Detected	2.079
Maximum Detected	343	Maximum Detected	5.838
Mean of Detected	120.1	Mean of Detected	3.382
SD of Detected	193	SD of Detected	2.128
Minimum Non-Detect	7.1	Minimum Non-Detect	1.96
Maximum Non-Detect	7.8	Maximum Non-Detect	2.054

Note: Data have multiple DLs - Use of KM Method is recommended

Number treated as Non-Detect 7

For all methods (except KM, DL/2, and ROS Methods),

Number treated as Detected 3

Observations < Largest ND are treated as NDs

Single DL Non-Detect Percentage 70.00%

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.753	Shapiro Wilk Test Statistic	0.78
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method		Assuming Lognormal Distribution	
Mean	38.58	Mean	1.919
SD	107	SD	1.423
90% DL/2 (t) UCL	85.37	90% H-Stat (DL/2) UCL	70.11

Maximum Likelihood Estimate(MLE) Method

MLE yields a negative mean

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	38.58	Mean	1.919
SD	107	SD	1.423
90% DL/2 (t) UCL	85.37	90% H-Stat (DL/2) UCL	70.11
Log ROS Method		Log ROS Method	
MLE yields a negative mean	N/A	Mean in Log Scale	-2.557
		SD in Log Scale	4.481
		Mean in Original Scale	36.04
		SD in Original Scale	107.9
		90% t UCL	83.24
		90% Percentile Bootstrap UCL	71.14
		90% BCA Bootstrap UCL	104.6

90% H-UCL 2.325E+8

Gamma Distribution Test with Detected Values Only**Data Distribution Test with Detected Values Only****Data appear Lognormal at 5% Significance Level**

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A

A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level**Nonparametric Statistics**

Kaplan-Meier (KM) Method	
Mean	41.63
SD	100.5

SE of Mean 38.91

90% KM (t) UCL 95.44

90% KM (z) UCL 91.49

90% KM (jackknife) UCL 87.19

90% KM (bootstrap t) UCL 6879

90% KM (BCA) UCL 343

90% KM (Percentile Bootstrap) UCL 343

90% KM (Chebyshev) UCL 158.4

95% KM (Chebyshev) UCL 211.2

97.5% KM (Chebyshev) UCL 284.6

99% KM (Chebyshev) UCL 428.7

Assuming Gamma Distribution**Gamma ROS Statistics using Extrapolated Data**

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A

90% Gamma Approximate UCL

90% Adjusted Gamma UCL

Potential UCL to Use

Recommendation Provided only

for 95% Confidence Coeficient

Note: DL/2 is not a recommended method.

Pyrene**General Statistics**

Number of Valid Observations	10	Number of Distinct Observations	10
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Raw Statistics**Log-transformed Statistics**

Minimum	10.1	Minimum of Log Data	2.313
Maximum	791	Maximum of Log Data	6.673
Mean	101.9	Mean of log Data	3.477
Median	20.8	SD of log Data	1.215
SD	242.5		
Std. Error of Mean	76.67		
Coefficient of Variation	2.379		
Skewness	3.146		

Relevant UCL Statistics**Normal Distribution Test****Lognormal Distribution Test**

Shapiro Wilk Test Statistic	0.41	Shapiro Wilk Test Statistic	0.724
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842

Data not Normal at 5% Significance Level**Data not Lognormal at 5% Significance Level****Assuming Normal Distribution****Assuming Lognormal Distribution**

90% Student's-t UCL 207.9

90% H-UCL 183.9

90% UCLs (Adjusted for Skewness)					90% Chebyshev (MVUE) UCL	134.6		
90% Adjusted-CLT UCL (Chen-1995)	254.6				95% Chebyshev (MVUE) UCL	168		
90% Modified-t UCL (Johnson-1978)	220.7				97.5% Chebyshev (MVUE) UCL	214.5		

Gamma Distribution Test

k star (bias corrected)	0.449
Theta Star	227
MLE of Mean	101.9
MLE of Standard Deviation	152.1
nu star	8.98
Approximate Chi Square Value (.05)	4.155
Adjusted Level of Significance	0.0724
Adjusted Chi Square Value	3.73
Anderson-Darling Test Statistic	2.034
Anderson-Darling 5% Critical Value	0.773
Kolmogorov-Smirnov Test Statistic	0.385
Kolmogorov-Smirnov 5% Critical Value	0.28

Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

90% CLT UCL	200.2
90% Jackknife UCL	207.9
90% Standard Bootstrap UCL	196
90% Bootstrap-t UCL	1836
90% Hall's Bootstrap UCL	1117
90% Percentile Bootstrap UCL	181.8
90% BCA Bootstrap UCL	256
90% Chebyshev(Mean, Sd) UCL	331.9
95% Chebyshev(Mean, Sd) UCL	436.1
97.5% Chebyshev(Mean, Sd) UCL	580.7
99% Chebyshev(Mean, Sd) UCL	864.8

Assuming Gamma Distribution

90% Approximate Gamma UCL	220.2
90% Adjusted Gamma UCL	245.4

Potential UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

TPHd

General Statistics

Number of Valid Data	10	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	10
		Percent Non-Detects	100.00%

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable TPHd was not processed!

TPHo

General Statistics

Number of Valid Data	10	Number of Detected Data	1
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Number of Distinct Detected Data	1	Number of Non-Detect Data	9
		Percent Non-Detects	90.00%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, B)

The data set for variable TPHo was not processed!

	General UCL Statistics for Data Sets with Non-Detects
User Selected Options	
From File	\STORAGE\Data\Projects\Port of Portland\Env Services Contract No. 320\1862-00 T4S1 Soil Pile Samp
Full Precision	OFF
Confidence Coefficient	90%
Number of Bootstrap Operations	2000

Acenaphthene

General Statistics

Number of Valid Data	15	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	11
		Percent Non-Detects	73.33%

Raw Statistics

Log-transformed Statistics

Minimum Detected	7.6	Minimum Detected	2.028
Maximum Detected	475	Maximum Detected	6.163
Mean of Detected	127.6	Mean of Detected	3.33
SD of Detected	231.6	SD of Detected	1.93
Minimum Non-Detect	7.2	Minimum Non-Detect	1.974
Maximum Non-Detect	773	Maximum Non-Detect	6.65

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect 15

Number treated as Detected 0

Single DL Non-Detect Percentage 100.00%

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only	Shapiro Wilk Test Statistic 0.648	Lognormal Distribution Test with Detected Values Only	Shapiro Wilk Test Statistic 0.788
	5% Shapiro Wilk Critical Value 0.748		5% Shapiro Wilk Critical Value 0.748
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	Mean 72.09	Assuming Lognormal Distribution	DL/2 Substitution Method
	SD 148		Mean 2.757
90% DL/2 (t) UCL	123.5		SD 1.664

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly

N/A

Log ROS Method

Mean In Log Scale	0.354
SD In Log Scale	2.177
Mean In Original Scale	34.49
SD In Original Scale	122

90% t UCL 76.85

90% Percentile Bootstrap UCL	67.29
90% BCA Bootstrap UCL	98.95
90% H-UCL	115.9

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

k star (bias corrected)	0.274
Theta Star	466.1
nu star	2.19

A-D Test Statistic	0.7
5% A-D Critical Value	0.689
K-S Test Statistic	0.689
5% K-S Critical Value	0.413

Data follow Appr. Gamma Distribution at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	42.3
SD	120.1
SE of Mean	37.06
90% KM (t) UCL	92.14
90% KM (z) UCL	89.79
90% KM (jackknife) UCL	86.47
90% KM (bootstrap t) UCL	1044
90% KM (BCA) UCL	101.2
90% KM (Percentile Bootstrap) UCL	101.1
90% KM (Chebyshev) UCL	153.5
95% KM (Chebyshev) UCL	203.8
97.5% KM (Chebyshev) UCL	273.7
99% KM (Chebyshev) UCL	411

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1.0000E-6
Maximum	475
Mean	34.03
Median	1.0000E-6
SD	122.1
k star	0.0978
Theta star	348.1
Nu star	2.933
AppChi2	0.566
90% Gamma Approximate UCL	176.4
90% Adjusted Gamma UCL	N/A

Potential UCL to Use

Recommendation Provided only
for 95% Confidence Coefficient

Note: DL/2 is not a recommended method.

Acenphthylene

General Statistics

Number of Valid Data	15	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	8
		Percent Non-Detects	53.33%

Raw Statistics

Log-transformed Statistics

Minimum Detected	9.6	Minimum Detected	2.262
Maximum Detected	78.9	Maximum Detected	4.368
Mean of Detected	31.33	Mean of Detected	3.133
SD of Detected	27.1	SD of Detected	0.845
Minimum Non-Detect	7.2	Minimum Non-Detect	1.974
Maximum Non-Detect	773	Maximum Non-Detect	6.65

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.811
5% Shapiro Wilk Critical Value	0.803

Data appear Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.882
5% Shapiro Wilk Critical Value	0.803

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	51.92
SD	96.02
90% DL/2 (t) UCL	85.26

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	3.065
SD	1.309
90% H-Stat (DL/2) UCL	114.6
Log ROS Method	
Mean in Log Scale	2.526
SD in Log Scale	0.899
Mean in Original Scale	19.06
SD in Original Scale	21.53
90% t UCL	26.53
90% Percentile Bootstrap UCL	26.32
90% BCA Bootstrap UCL	28.67
90% H-UCL	29.45

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.096
Theta Star	28.57
nu star	15.35

A-D Test Statistic

0.505

5% A-D Critical Value

0.718

K-S Test Statistic

0.718

5% K-S Critical Value

0.316

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean

SD

SE of Mean

90% KM (t) UCL

90% KM (z) UCL

90% KM (jackknife) UCL

90% KM (bootstrap t) UCL

90% KM (BCA) UCL

90% KM (Percentile Bootstrap) UCL

90% KM (Chebyshev) UCL

95% KM (Chebyshev) UCL

97.5% KM (Chebyshev) UCL

99% KM (Chebyshev) UCL

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum

1.0000E-6

Maximum

78.9

Mean

16.76

Median

10.41

SD

22.9

k star

0.179

Theta star

93.7

Nu star

5.366

AppChi2

1.825

90% Gamma Approximate UCL

49.27

90% Adjusted Gamma UCL

54.95

Potential UCL to Use

Recommendation Provided only

for 95% Confidence Coeficient

Note: DL/2 is not a recommended method.

General Statistics	
Number of Valid Data	15
Number of Distinct Detected Data	8
Number of Detected Data	8
Number of Non-Detect Data	7
Percent Non-Detects	46.67%
Raw Statistics	
Minimum Detected	7.8
Maximum Detected	1310
Mean of Detected	179.5
SD of Detected	456.9
Minimum Non-Detect	7.3
Maximum Non-Detect	773
Log-transformed Statistics	
Minimum Detected	2.054
Maximum Detected	7.178
Mean of Detected	3.301
SD of Detected	1.648
Minimum Non-Detect	1.988
Maximum Non-Detect	6.65
Note: Data have multiple DLs - Use of KM Method is recommended	
For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest ND are treated as NDs	
Number treated as Non-Detect	14
Number treated as Detected	1
Single DL Non-Detect Percentage	93.33%
Warning: There are only 8 Detected Values in this data	
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions	
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.	
UCL Statistics	
Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.438
5% Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level	
Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.694
5% Shapiro Wilk Critical Value	0.818
Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	132.8
SD	339.4
90% DL/2 (t) UCL	250.7
Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean	3.278
SD	1.587
90% H-Stat (DL/2) UCL	293.1
Maximum Likelihood Estimate(MLE) Method	
MLE method failed to converge properly	N/A
Log ROS Method	
Mean in Log Scale	2.607
SD in Log Scale	1.535
Mean in Original Scale	99.55
SD in Original Scale	.335
90% t UCL	215.9
90% Percentile Bootstrap UCL	188.3
90% BCA Bootstrap UCL	274.8
90% H-UCL	129.4
Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.305
Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	

Theta Star	588.1				
nu star	4.885				
A-D Test Statistic	1.777			Nonparametric Statistics	
5% A-D Critical Value	0.788			Kaplan-Meier (KM) Method	
K-S Test Statistic	0.788			Mean	101.7
5% K-S Critical Value	0.315			SD	323.1
Data not Gamma Distributed at 5% Significance Level				SE of Mean	89.2
Assuming Gamma Distribution				90% KM (t) UCL	221.7
Gamma ROS Statistics using Extrapolated Data				90% KM (z) UCL	216
Minimum	1.0000E-6			90% KM (jackknife) UCL	217.6
Maximum	1310			90% KM (bootstrap t) UCL	5041
Mean	95.75			90% KM (BCA) UCL	192.2
Median	7.8			90% KM (Percentile Bootstrap) UCL	192.4
SD	336.1			90% KM (Chebyshev) UCL	369.3
k star	0.116			95% KM (Chebyshev) UCL	490.5
Theta star	827.6			97.5% KM (Chebyshev) UCL	658.7
Nu star	3.471			99% KM (Chebyshev) UCL	989.2
AppChi2	0.807			Potential UCL to Use	
90% Gamma Approximate UCL	412			Recommendation Provided only	
90% Adjusted Gamma UCL	477.1			for 95% Confidence Coefficient	

Note: DL/2 is not a recommended method.

BaA

General Statistics			
Raw Statistics		Log-transformed Statistics	
Number of Valid Data	15	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	3
		Percent Non-Detects	20.00%
Minimum Detected	13	Minimum Detected	2.565
Maximum Detected	2210	Maximum Detected	7.701
Mean of Detected	334.1	Mean of Detected	4.658
SD of Detected	642.6	SD of Detected	1.466
Minimum Non-Detect	29.6	Minimum Non-Detect	3.388
Maximum Non-Detect	72.4	Maximum Non-Detect	4.282
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	6
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	60.00%

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.548	Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	

Mean	272.7	Mean	4.374
SD	583.6	SD	1.437
90% DL/2 (t) UCL	475.4	90% H-Stat (DL/2) UCL	582.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.338
		SD in Log Scale	1.469
		Mean in Original Scale	271.8
		SD in Original Scale	584
		90% t UCL	474.7
		90% Percentile Bootstrap UCL	486.6
		90% BCA Bootstrap UCL	568.1
		90% H-UCL	610.5
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.463	Data appear Lognormal at 5% Significance Level	
Theta Star	721.1		
nu star	11.12		
A-D Test Statistic	1.12	Nonparametric Statistics	
5% A-D Critical Value	0.782	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.782	Mean	273.3
5% K-S Critical Value	0.258	SD	563.6
Data not Gamma Distributed at 5% Significance Level		SE of Mean	152
Assuming Gamma Distribution		90% KM (t) UCL	477.8
Gamma ROS Statistics using Extrapolated Data		90% KM (z) UCL	468.2
Minimum	1.0000E-6	90% KM (jackknife) UCL	476
Maximum	2210	90% KM (bootstrap t) UCL	1615
Mean	267.3	90% KM (BCA) UCL	459.7
Median	67.5	90% KM (Percentile Bootstrap) UCL	471.7
SD	586.2	90% KM (Chebyshev) UCL	729.4
k star	0.176	95% KM (Chebyshev) UCL	936
Theta star	1522	97.5% KM (Chebyshev) UCL	1223
Nu star	5.27	99% KM (Chebyshev) UCL	1786
AppChi2	1.769	Potential UCL to Use	
90% Gamma Approximate UCL	796.2	Recommendation Provided only	
90% Adjusted Gamma UCL	889.2	for 95% Confidence Coeficient	

Note: DL/2 is not a recommended method.

BaP

General Statistics			
Number of Valid Observations	15	Number of Distinct Observations	15
Raw Statistics		Log-transformed Statistics	
Minimum	32.3	Minimum of Log Data	3.475
Maximum	1290	Maximum of Log Data	7.162
Mean	258.3	Mean of log Data	4.951
Median	124	SD of log Data	1.039
SD	361.3		

Std. Error of Mean	93.28
Coefficient of Variation	1.399
Skewness	2.295

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.621
Shapiro Wilk Critical Value	0.881

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.881

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

90% Student's-t UCL	383.8
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90% UCLs (Adjusted for Skewness)

90% Adjusted-CLT UCL (Chen-1995)	417.3
90% Modified-t UCL (Johnson-1978)	393

Assuming Lognormal Distribution

90% H-UCL	425.5
90% Chebyshev (MVUE) UCL	433.8
95% Chebyshev (MVUE) UCL	525.9
97.5% Chebyshev (MVUE) UCL	653.8
99% Chebyshev (MVUE) UCL	905.1

Gamma Distribution Test

k star (bias corrected)	0.814
Theta Star	317.5
MLE of Mean	258.3
MLE of Standard Deviation	286.4
nu star	24.41
Approximate Chi Square Value (.05)	15.99
Adjusted Level of Significance	0.0795
Adjusted Chi Square Value	15.33
Anderson-Darling Test Statistic	1.208
Anderson-Darling 5% Critical Value	0.765
Kolmogorov-Smirnov Test Statistic	0.295
Kolmogorov-Smirnov 5% Critical Value	0.228

Data not Gamma Distributed at 5% Significance Level

Data Distribution

90% CLT UCL	377.9
90% Jackknife UCL	383.8
90% Standard Bootstrap UCL	377
90% Bootstrap-t UCL	555
90% Hall's Bootstrap UCL	488.2
90% Percentile Bootstrap UCL	379.4
90% BCA Bootstrap UCL	444.5
90% Chebyshev(Mean, Sd) UCL	538.2
95% Chebyshev(Mean, Sd) UCL	664.9
97.5% Chebyshev(Mean, Sd) UCL	840.9
99% Chebyshev(Mean, Sd) UCL	1186

Assuming Gamma Distribution

90% Approximate Gamma UCL	394.3
90% Adjusted Gamma UCL	411.2

Potential UCL to Use

Recommendation Provided only for 95% Confidence Coefficient

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

BbF

General Statistics

Number of Valid Data	15	Number of Detected Data	14
Number of Distinct Detected Data	14	Number of Non-Detect Data	1

Percent Non-Detects 6.67%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	29.1	Minimum Detected	3.371
Maximum Detected	1740	Maximum Detected	7.462
Mean of Detected	229.2	Mean of Detected	4.737
SD of Detected	442.4	SD of Detected	0.997
Minimum Non-Detect	773	Minimum Non-Detect	6.65
Maximum Non-Detect	773	Maximum Non-Detect	6.65
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.437	Shapiro Wilk Test Statistic	0.871
5% Shapiro Wilk Critical Value	0.874	5% Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	239.7	Mean	4.819
SD	428.3	SD	1.011
90% DL/2 (t) UCL	388.4	90% H-Stat (DL/2) UCL	354.1
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.73
		SD in Log Scale	0.961
		Mean in Original Scale	220.7
		SD in Original Scale	427.6
		90% t UCL	369.2
		90% Percentile Bootstrap UCL	349.1
		90% BCA Bootstrap UCL	446.6
		90% H-UCL	296.3
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.712	Data do not follow a Discernable Distribution (0.05)	
Theta Star	322		
nu star	19.93		
A-D Test Statistic	1.664	Nonparametric Statistics	
5% A-D Critical Value	0.767	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.767	Mean	221.4
5% K-S Critical Value	0.237	SD	413.4
Data not Gamma Distributed at 5% Significance Level		SE of Mean	110.9
		90% KM (t) UCL	370.6
		90% KM (z) UCL	363.6
Assuming Gamma Distribution			
Gamma ROS Statistics using Extrapolated Data		90% KM (jackknife) UCL	370.3
Minimum	29.1	90% KM (bootstrap t) UCL	1328
Maximum	1740	90% KM (BCA) UCL	355.8
Mean	224.5	90% KM (Percentile Bootstrap) UCL	348.6
Median	108	90% KM (Chebyshev) UCL	554.2
SD	426.7	95% KM (Chebyshev) UCL	705
k star	0.76	97.5% KM (Chebyshev) UCL	914.2
Theta star	295.5	99% KM (Chebyshev) UCL	1325
Nu star	22.79		

AppChi2	14.68	Potential UCL to Use
90% Gamma Approximate UCL	348.6	Recommendation Provided only
90% Adjusted Gamma UCL	364.2	for 95% Confidence Coefcient

Note: DL/2 is not a recommended method.

BghiP

General Statistics

Number of Valid Data	15	Number of Detected Data	14
Number of Distinct Detected Data	14	Number of Non-Detect Data	1
		Percent Non-Detects	6.67%

Raw Statistics

Log-transformed Statistics

Minimum Detected	33.2	Minimum Detected	3.503
Maximum Detected	911	Maximum Detected	6.815
Mean of Detected	181.9	Mean of Detected	4.773
SD of Detected	227	SD of Detected	0.891
Minimum Non-Detect	159	Minimum Non-Detect	5.069
Maximum Non-Detect	159	Maximum Non-Detect	5.069

UCL Statistics

Normal Distribution Test with Detected Values Only

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.609
5% Shapiro Wilk Critical Value	0.874

Shapiro Wilk Test Statistic	0.935
5% Shapiro Wilk Critical Value	0.874

Data not Normal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Lognormal Distribution

DL/2 Substitution Method		DL/2 Substitution Method	
Mean	175.1	Mean	4.746
SD	220.4	SD	0.865
90% DL/2 (t) UCL	251.6	90% H-Stat (DL/2) UCL	256.3

Maximum Likelihood Estimate(MLE) Method

Log ROS Method

Mean	584.1	Mean in Log Scale	4.754
SD	283	SD in Log Scale	0.862
90% MLE (t) UCL	682.4	Mean in Original Scale	175.8
90% MLE (Tiku) UCL	797.6	SD in Original Scale	220
		90% t UCL	252.2
		90% Percentile Bootstrap UCL	247.2
		90% BCA Bootstrap UCL	291.9
		90% H UCL	257.1

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

k star (bias corrected)	1.071	Data appear Lognormal at 5% Significance Level
Theta Star	169.9	
nu star	29.98	
A-D Test Statistic	0.816	Nonparametric Statistics
5% A-D Critical Value	0.754	Kaplan-Meier (KM) Method
K-S Test Statistic	0.754	Mean
		175.9

	5% K-S Critical Value	0.234		SD	212.8
Data not Gamma Distributed at 5% Significance Level				SE of Mean	57.07
				90% KM (t) UCL	252.7
Assuming Gamma Distribution				90% KM (z) UCL	249.1
Gamma ROS Statistics using Extrapolated Data				90% KM (jackknife) UCL	252.5
Minimum	33.2			90% KM (bootstrap t) UCL	385.3
Maximum	911			90% KM (BCA) UCL	250.6
Mean	178			90% KM (Percentile Bootstrap) UCL	254.6
Median	103			90% KM (Chebyshev) UCL	347.1
SD	219.3			95% KM (Chebyshev) UCL	424.7
k star	1.143			97.5% KM (Chebyshev) UCL	532.3
Theta star	155.7			99% KM (Chebyshev) UCL	743.8
Nu star	34.3				
AppChi2	24.21			Potential UCL to Use	
90% Gamma Approximate UCL	252.2			Recommendation Provided only	
90% Adjusted Gamma UCL	261.1			for 95% Confidence Coefficient	

Note: DL/2 is not a recommended method.

BkF

General Statistics					
Number of Valid Data	15		Number of Detected Data	14	
Number of Distinct Detected Data	14		Number of Non-Detect Data	1	
			Percent Non-Detects	6.67%	
Raw Statistics			Log-transformed Statistics		
Minimum Detected	11.9		Minimum Detected	2.477	
Maximum Detected	869		Maximum Detected	6.767	
Mean of Detected	164.4		Mean of Detected	4.285	
SD of Detected	270		SD of Detected	1.188	
Minimum Non-Detect	159		Minimum Non-Detect	5.069	
Maximum Non-Detect	159		Maximum Non-Detect	5.069	
UCL Statistics					
Normal Distribution Test with Detected Values Only			Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.562		Shapiro Wilk Test Statistic	0.888	
5% Shapiro Wilk Critical Value	0.874		5% Shapiro Wilk Critical Value	0.874	
Data not Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution			Assuming Lognormal Distribution		
DL/2 Substitution Method			DL/2 Substitution Method		
Mean	158.7		Mean	4.291	
SD	261.1		SD	1.145	
90% DL/2 (t) UCL	249.4		90% H-Stat (DL/2) UCL	271.6	
Maximum Likelihood Estimate(MLE) Method	N/A		Log ROS Method		
MLE yields a negative mean			Mean in Log Scale	4.261	
			SD in Log Scale	1.149	
			Mean in Original Scale	156.8	
			SD in Original Scale	261.8	

90% t UCL	247.7
90% Percentile Bootstrap UCL	244.8
90% BCA Bootstrap UCL	273.5
90% H-UCL	265.6

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.625
Theta Star	263
nu star	17.5

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

A-D Test Statistic	1.513
5% A-D Critical Value	0.772
K-S Test Statistic	0.772
5% K-S Critical Value	0.238

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	156.7
SD	253.1
SE of Mean	67.83

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	11.9
Maximum	869
Mean	157.2
Median	55.5
SD	261.7
k star	0.651
Theta star	241.6
Nu star	19.52
AppChi2	12.06
90% Gamma Approximate UCL	254.4
90% Adjusted Gamma UCL	266.8

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	156.7
SD	253.1
SE of Mean	67.83
90% KM (t) UCL	247.9
90% KM (z) UCL	243.6
90% KM (jackknife) UCL	247.7
90% KM (bootstrap t) UCL	618.1
90% KM (BCA) UCL	249.5
90% KM (Percentile Bootstrap) UCL	250.7
90% KM (Chebyshev) UCL	360.2
95% KM (Chebyshev) UCL	452.3
97.5% KM (Chebyshev) UCL	580.3
99% KM (Chebyshev) UCL	831.6

Potential UCL to Use

Recommendation Provided only
for 95% Confidence Coefficient

Note: DL/2 is not a recommended method.

C

General Statistics

Number of Valid Data	15	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	5
		Percent Non-Detects	33.33%

Raw Statistics

Minimum Detected	21.2
Maximum Detected	2710
Mean of Detected	358
SD of Detected	829.9
Minimum Non-Detect	44.4
Maximum Non-Detect	1290

Log-transformed Statistics

Minimum Detected	3.054
Maximum Detected	7.905
Mean of Detected	4.691
SD of Detected	1.317
Minimum Non-Detect	3.793
Maximum Non-Detect	7.162

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect	14
Number treated as Detected	1
Single DL Non-Detect Percentage	93.33%

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only			
Shapiro Wilk Test Statistic	0.435	Shapiro Wilk Test Statistic	0.829		
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution			
DL/2 Substitution Method		DL/2 Substitution Method			
Mean	301.2	Mean	4.632		
SD	685	SD	1.27		
90% DL/2 (t) UCL	539.1	90% H-Stat (DL/2) UCL	501		
Maximum Likelihood Estimate(MLE) Method		Log ROS Method			
MLE method failed to converge properly		Mean in Log Scale	4.444		
		SD in Log Scale	1.149		
		Mean in Original Scale	257.5		
		SD in Original Scale	681.6		
		90% t UCL	494.2		
		90% Percentile Bootstrap UCL	449.3		
		90% BCA Bootstrap UCL	619.8		
		90% H-UCL	318.6		
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only			
k star (bias corrected)	0.437	Data do not follow a Discernable Distribution (0.05)			
Theta Star	818.9				
nu star	8.744				
A-D Test Statistic	1.632	Nonparametric Statistics			
5% A-D Critical Value	0.775	Kaplan-Meier (KM) Method			
K-S Test Statistic	0.775	Mean	260.4		
5% K-S Critical Value	0.28	SD	658.2		
Data not Gamma Distributed at 5% Significance Level		SE of Mean	179.3		
		90% KM (t) UCL	501.6		
Assuming Gamma Distribution		90% KM (z) UCL	490.2		
Gamma ROS Statistics using Extrapolated Data		90% KM (jackknife) UCL	497.3		
Minimum	1.0000E-6	90% KM (bootstrap t) UCL	3717		
Maximum	2710	90% KM (BCA) UCL	443.6		
Mean	242.5	90% KM (Percentile Bootstrap) UCL	459.3		
Median	60.6	90% KM (Chebyshev) UCL	798.4		
SD	686.6	95% KM (Chebyshev) UCL	1042		
k star	0.174	97.5% KM (Chebyshev) UCL	1380		
Theta star	1391	99% KM (Chebyshev) UCL	2045		
Nu star	5.231	Potential UCL to Use			
AppChi2	1.746	Recommendation Provided only			
90% Gamma Approximate UCL	726.5	for 95% Confidence Coefficient			
90% Adjusted Gamma UCL	811.8				
Note: DL/2 is not a recommended method.					
Dibenzo					
General Statistics					
Number of Valid Data	15	Number of Detected Data	9		

Number of Distinct Detected Data	9	Number of Non-Detect Data	6
Percent Non-Detects			40.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	8.6	Minimum Detected	2.152
Maximum Detected	152	Maximum Detected	5.024
Mean of Detected	36.27	Mean of Detected	3.139
SD of Detected	45.83	SD of Detected	0.91
Minimum Non-Detect	8.2	Minimum Non-Detect	2.104
Maximum Non-Detect	773	Maximum Non-Detect	6.65
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	15
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.628	Shapiro Wilk Test Statistic	0.888
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method

Mean	58.57
SD	98.34
90% DL/2 (t) UCL	92.73

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	3.315
SD	1.168
90% H-Stat (DL/2) UCL	107.4

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly

N/A

Log ROS Method

Mean in Log Scale	2.889
SD in Log Scale	0.857
Mean in Original Scale	27.4
SD in Original Scale	36.57
90% t UCL	40.1
90% Percentile Bootstrap UCL	40.41
90% BCA Bootstrap UCL	46.86
90% H-UCL	39.56

Gamma Distribution Test with Detected Values Only

k star (bias corrected)

Theta Star

nu star

A-D Test Statistic

5% A-D Critical Value

K-S Test Statistic

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean

5% K-S Critical Value	0.285	SD	37.68
Data not Gamma Distributed at 5% Significance Level		SE of Mean	11.24
Assuming Gamma Distribution		90% KM (t) UCL	45.15
Gamma ROS Statistics using Extrapolated Data		90% KM (z) UCL	44.43
Minimum	1.0000E-6	90% KM (jackknife) UCL	44.99
Maximum	152	90% KM (bootstrap t) UCL	95.19
Mean	29.06	90% KM (Percentile Bootstrap) UCL	45.28
Median	21.08	90% KM (Chebyshev) UCL	63.75
SD	36.31	95% KM (Chebyshev) UCL	79.02
k star	0.416	97.5% KM (Chebyshev) UCL	100.2
Theta star	69.9	99% KM (Chebyshev) UCL	141.9
Nu star	12.47	Potential UCL to Use	
AppChi2	6.652	Recommendation Provided only	
90% Gamma Approximate UCL	54.49	for 95% Confidence Coefficient	
90% Adjusted Gamma UCL	58.02		

Note: DL/2 is not a recommended method.

Fluoranthene

General Statistics

Number of Valid Data	15	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	3
		Percent Non-Detects	20.00%

Raw Statistics

Log-transformed Statistics

Minimum Detected	17.4	Minimum Detected	2.856
Maximum Detected	5130	Maximum Detected	8.543
Mean of Detected	510.3	Mean of Detected	4.551
SD of Detected	1458	SD of Detected	1.465
Minimum Non-Detect	71.5	Minimum Non-Detect	4.27
Maximum Non-Detect	1660	Maximum Non-Detect	7.415

Note: Data have multiple DLs - Use of KM Method is recommended

Number treated as Non-Detect: 14

For all methods (except KM, DL/2, and ROS Methods),

Number treated as Detected: 1

Observations < Largest ND are treated as NDs

Single DL Non-Detect Percentage: 93.33%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.368	Shapiro Wilk Test Statistic	0.787
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level			Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Lognormal Distribution

DL/2 Substitution Method		DL/2 Substitution Method	
Mean	496.2	Mean	4.735
SD	1301	SD	1.493
90% DL/2 (t) UCL	948	90% H-Stat (DL/2) UCL	969.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	4.424

SD in Log Scale	1.346
Mean in Original Scale	419.5
SD in Original Scale	1306
90% t UCL	872.9
90% Percentile Bootstrap UCL	778.4
90% BCA Bootstrap UCL	1111
90% H-UCL	487.4

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.35
Theta Star	1460
nu star	8.391

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic	2.309
5% A-D Critical Value	0.806
K-S Test Statistic	0.806
5% K-S Critical Value	0.262

Nonparametric Statistics

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1.0000E-6
Maximum	5130
Mean	408.2
Median	72.4
SD	1309
k star	0.164
Theta star	2486
Nu star	4.927
AppChi2	1.572
90% Gamma Approximate UCL	1280
90% Adjusted Gamma UCL	1437

Kaplan-Meier (KM) Method

Mean	421.7
SD	1261
SE of Mean	340.2
90% KM (t) UCL	879.4
90% KM (z) UCL	857.8
90% KM (jackknife) UCL	875.3
90% KM (bootstrap t) UCL	13898
90% KM (BCA) UCL	780.2
90% KM (Percentile Bootstrap) UCL	782.2
90% KM (Chebyshev) UCL	1442
95% KM (Chebyshev) UCL	1905
97.5% KM (Chebyshev) UCL	2547
99% KM (Chebyshev) UCL	3807

Potential UCL to Use

Recommendation Provided only
for 95% Confidence Coefficient

Note: DL/2 is not a recommended method.

Fluorene

General Statistics

Number of Valid Data	15	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	12
		Percent Non-Detects	80.00%

Raw Statistics

Minimum Detected	8.8	Log-transformed Statistics	
Maximum Detected	628	Minimum Detected	2.175
Mean of Detected	216.3	Maximum Detected	6.443
SD of Detected	356.5	Mean of Detected	3.706
Minimum Non-Detect	7.2	SD of Detected	2.375
Maximum Non-Detect	773	Minimum Non-Detect	1.974
		Maximum Non-Detect	6.65

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Number treated as Non-Detect

Number treated as Detected

Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%	
Warning: There are only 3 Distinct Detected Values in this data set			
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.			
Those methods will return a 'N/A' value on your output display!			
It is necessary to have 4 or more Distinct Values for bootstrap methods.			
However, results obtained using 4 to 9 distinct values may not be reliable.			
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.754	Shapiro Wilk Test Statistic	0.807
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data not Normal at 5% Significance Level			
Data appear Lognormal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	81.59	Mean	2.703
SD	179.9	SD	1.733
90% DL/2 (t) UCL	144.1	90% H-Stat (DL/2) UCL	254.8
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.622
		SD in Log Scale	2.961
		Mean in Original Scale	43.32
		SD in Original Scale	161.8
		90% t UCL	99.51
		90% Percentile Bootstrap UCL	86.22
		90% BCA Bootstrap UCL	127.8
		90% H-UCL	599
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
Data appear Lognormal at 5% Significance Level			
Gamma			
k star (bias corrected)	N/A		
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	53.38
5% K-S Critical Value	N/A	SD	159.4
Data not Gamma Distributed at 5% Significance Level		SE of Mean	52.17
		90% KM (t) UCL	123.5
		90% KM (z) UCL	120.2
Assuming Gamma Distribution		90% KM (jackknife) UCL	110.8
Gamma ROS Statistics using Extrapolated Data		90% KM (bootstrap t) UCL	4702
Minimum	N/A	90% KM (BCA) UCL	628
Maximum	N/A	90% KM (Percentile Bootstrap) UCL	628
Mean	N/A	90% KM (Chebyshev) UCL	209.9
Median	N/A	95% KM (Chebyshev) UCL	280.8
SD	N/A	97.5% KM (Chebyshev) UCL	379.2
k star	N/A		

Theta star	N/A	99% KM (Chebyshev) UCL	572.4
Nu star	N/A		
AppChi2	N/A	Potential UCL to Use	
90% Gamma Approximate UCL	N/A	Recommendation Provided only	
90% Adjusted Gamma UCL	N/A	for 95% Confidence Coeficient	

Note: DL/2 is not a recommended method.

Indeno

General Statistics

Number of Valid Data	15	Number of Detected Data	13
Number of Distinct Detected Data	13	Number of Non-Detect Data	2
		Percent Non-Detects	13.33%

Raw Statistics

Log-transformed Statistics

Minimum Detected	20.5	Minimum Detected	3.02
Maximum Detected	300	Maximum Detected	5.704
Mean of Detected	94.47	Mean of Detected	4.255
SD of Detected	83.75	SD of Detected	0.785
Minimum Non-Detect	159	Minimum Non-Detect	5.069
Maximum Non-Detect	773	Maximum Non-Detect	6.65

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect 15

Number treated as Detected 0

Single DL Non-Detect Percentage 100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.741	Shapiro Wilk Test Statistic	0.938
5% Shapiro Wilk Critical Value	0.866	5% Shapiro Wilk Critical Value	0.866

Data not Normal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Lognormal Distribution

DL/2 Substitution Method

DL/2 Substitution Method

Mean

Mean

SD

SD

90% DL/2 (t) UCL

90% H-Stat (DL/2) UCL

Maximum Likelihood Estimate(MLE) Method

N/A

Log ROS Method

MLE method failed to converge properly

Mean in Log Scale

SD in Log Scale

Mean in Original Scale

SD in Original Scale

90% t UCL

90% Percentile Bootstrap UCL

90% BCA Bootstrap UCL

90% H-UCL

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

k star (bias corrected)

Data appear Gamma Distributed at 5% Significance Level

Theta Star

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
A-D Test Statistic	0.606
5% A-D Critical Value	0.745
K-S Test Statistic	0.745
5% K-S Critical Value	0.24
Data appear Gamma Distributed at 5% Significance Level	SE of Mean
Assuming Gamma Distribution	90% KM (t) UCL
Gamma ROS Statistics using Extrapolated Data	90% KM (z) UCL
Minimum	90% KM (jackknife) UCL
Maximum	90% KM (bootstrap t) UCL
Mean	90% KM (BCA) UCL
Median	90% KM (Percentile Bootstrap) UCL
SD	90% KM (Chebyshev) UCL
k star	95% KM (Chebyshev) UCL
Theta star	97.5% KM (Chebyshev) UCL
Nu star	187.1
AppChi2	228.0
90% Gamma Approximate UCL	309.0
90% Adjusted Gamma UCL	Potential UCL to Use
90% Gamma Approximate UCL	Recommendation Provided only
90% Adjusted Gamma UCL	for 95% Confidence Coefficient

Note: DL/2 is not a recommended method.

Naph

General Statistics

Number of Valid Data	15	Number of Detected Data	9
Number of Distinct Detected Data	8	Number of Non-Detect Data	6

Raw Statistics

Log-transformed Statistics

Minimum Detected	10.2	Minimum Detected	2.322
Maximum Detected	76.5	Maximum Detected	4.337
Mean of Detected	35.42	Mean of Detected	3.295
SD of Detected	26.99	SD of Detected	0.789
Minimum Non-Detect	7.3	Minimum Non-Detect	1.988
Maximum Non-Detect	773	Maximum Non-Detect	6.65

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect 15

Number treated as Detected

Single DL Non-Detect Percentage 100.00%

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCI Statistics

Normal Distribution Test with Detected Values Only

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.816	Shapiro Wilk Test Statistic	0.89
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	58.04	Mean	3.4
SD	94.42	SD	1.119
90% DL/2 (t) UCL	90.83	90% H-Stat (DL/2) UCL	105.6
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.036
		SD in Log Scale	0.757
		Mean in Original Scale	27.49
		SD in Original Scale	23.02
		90% t UCL	35.48
		90% Percentile Bootstrap UCL	35.33
		90% BCA Bootstrap UCL	35.87
		90% H-UCL	39.42
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.397	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	25.35		
nu star	25.15		
A-D Test Statistic	0.575	Nonparametric Statistics	
5% A-D Critical Value	0.73	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.73	Mean	29.68
5% K-S Critical Value	0.283	SD	23.87
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	7.281
		90% KM (t) UCL	39.47
Assuming Gamma Distribution		90% KM (z) UCL	39.01
Gamma ROS Statistics using Extrapolated Data		90% KM (jackknife) UCL	39.31
Minimum	1.0000E-6	90% KM (bootstrap t) UCL	41.41
Maximum	76.5	90% KM (BCA) UCL	39.17
Mean	28.63	90% KM (Percentile Bootstrap) UCL	39.27
Median	19.9	90% KM (Chebyshev) UCL	51.52
SD	23.14	95% KM (Chebyshev) UCL	61.41
k star	0.441	97.5% KM (Chebyshev) UCL	75.14
Theta star	64.97	99% KM (Chebyshev) UCL	102.1
Nu star	13.22	Potential UCL to Use	
AppChi2	7.204	Recommendation Provided only	
90% Gamma Approximate UCL	52.52	for 95% Confidence Coefficient	
90% Adjusted Gamma UCL	55.8		

Note: DL/2 is not a recommended method.

Phen

General Statistics

Number of Valid Data	15	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	5

									Percent Non-Detects	33.33%
Raw Statistics					Log-transformed Statistics					
Minimum Detected	9.4				Minimum Detected	2.241				
Maximum Detected	3500				Maximum Detected	8.161				
Mean of Detected	386.5				Mean of Detected	3.972				
SD of Detected	1094				SD of Detected	1.618				
Minimum Non-Detect	29.6				Minimum Non-Detect	3.388				
Maximum Non-Detect	773				Maximum Non-Detect	6.65				
Note: Data have multiple DLs - Use of KM Method is recommended For all methods (except KM, DL/2, and ROS Methods), Observations < Largest ND are treated as NDs					Number treated as Non-Detect	14				
					Number treated as Detected	1				
					Single DL Non-Detect Percentage	93.33%				
UCL Statistics										
Normal Distribution Test with Detected Values Only					Lognormal Distribution Test with Detected Values Only					
Shapiro Wilk Test Statistic	0.385				Shapiro Wilk Test Statistic	0.768				
5% Shapiro Wilk Critical Value	0.842				5% Shapiro Wilk Critical Value	0.842				
Data not Normal at 5% Significance Level					Data not Lognormal at 5% Significance Level					
Assuming Normal Distribution					Assuming Lognormal Distribution					
DL/2 Substitution Method					DL/2 Substitution Method					
Mean	294.2				Mean	3.985				
SD	891.6				SD	1.457				
90% DL/2 (t) UCL	603.8				90% H-Stat (DL/2) UCL	415.5				
Maximum Likelihood Estimate(MLE) Method	N/A				Log ROS Method					
MLE method failed to converge properly					Mean in Log Scale	3.711				
					SD in Log Scale	1.376				
					Mean in Original Scale	266.4				
					SD in Original Scale	894.8				
					90% t UCL	577.1				
					90% Percentile Bootstrap UCL	504.3				
					90% BCA Bootstrap UCL	730.2				
					90% H-UCL	256.8				
Gamma Distribution Test with Detected Values Only					Data Distribution Test with Detected Values Only					
k star (bias corrected)	0.305				Data do not follow a Discernable Distribution (0.05)					
Theta Star	1268									
nu star	6.097									
A-D Test Statistic	2.077				Nonparametric Statistics					
5% A-D Critical Value	0.806				Kaplan-Meier (KM) Method					
K-S Test Statistic	0.806				Mean					
5% K-S Critical Value	0.286				SD					
Data not Gamma Distributed at 5% Significance Level					SE of Mean					
Assuming Gamma Distribution					90% KM (t) UCL					
Gamma ROS Statistics using Extrapolated Data					90% KM (z) UCL					
Minimum	1.0000E-6				90% KM (jackknife) UCL					
Maximum	3500				90% KM (bootstrap t) UCL					
Mean	257.6				90% KM (BCA) UCL					
					90% KM (Percentile Bootstrap) UCL					

Median	19.2	90% KM (Chebyshev) UCL	973.1
SD	897.4	95% KM (Chebyshev) UCL	1293
k star	0.13	97.5% KM (Chebyshev) UCL	1736
Theta star	1979	99% KM (Chebyshev) UCL	2608
Nu star	3.906		
AppChi2	1.02	Potential UCL to Use	
90% Gamma Approximate UCL	986.2	Recommendation Provided only	
90% Adjusted Gamma UCL	1130	for 95% Confidence Coefficient	

Note: DL/2 is not a recommended method.

Pyrene

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	15
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Raw Statistics

Log-transformed Statistics

Minimum	22.3	Minimum of Log Data	3.105
Maximum	3460	Maximum of Log Data	8.149
Mean	398.6	Mean of log Data	4.854
Median	102	SD of log Data	1.338
SD	881.8		
Std. Error of Mean	227.7		
Coefficient of Variation	2.213		
Skewness	3.423		

Relevant UCL Statistics

Normal Distribution Test

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.459	Shapiro Wilk Test Statistic	0.894
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881

Data not Normal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Lognormal Distribution

90% Student's-t UCL	704.8	90% H-UCL	735
90% UCLs (Adjusted for Skewness)		90% Chebyshev (MVUE) UCL	617.5
90% Adjusted-CLT UCL (Chen-1995)	834.1	95% Chebyshev (MVUE) UCL	768.3
90% Modified-t UCL (Johnson-1978)	738.4	97.5% Chebyshev (MVUE) UCL	977.7
		99% Chebyshev (MVUE) UCL	1389

Gamma Distribution Test

Data Distribution

k star (bias corrected)	0.486	Data appear Lognormal at 5% Significance Level	
Theta Star	820.3		
MLE of Mean	398.6		
MLE of Standard Deviation	571.8		
nu star	14.58		
Approximate Chi Square Value (.05)	8.225		
Adjusted Level of Significance	0.0795	90% CLT UCL	690.4
Adjusted Chi Square Value	7.769	90% Jackknife UCL	704.8
		90% Standard Bootstrap UCL	668.9
Anderson-Darling Test Statistic	1.654	90% Bootstrap-t UCL	1769
Anderson-Darling 5% Critical Value	0.789	90% Hall's Bootstrap UCL	1931
Kolmogorov-Smirnov Test Statistic	0.323	90% Percentile Bootstrap UCL	686.9

Kolmogorov-Smirnov 5% Critical Value	0.233	90% BCA Bootstrap UCL	879.6
Data not Gamma Distributed at 5% Significance Level		90% Chebyshev(Mean, Sd) UCL	1082
		95% Chebyshev(Mean, Sd) UCL	1391
		97.5% Chebyshev(Mean, Sd) UCL	1820
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2664
90% Approximate Gamma UCL	706.3		
90% Adjusted Gamma UCL	747.8		
Potential UCL to Use		Recommendation Provided only for 95% Confidence Coefficient	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

TPHd

General Statistics

Number of Valid Data	15	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	10
		Percent Non-Detects	66.67%

Raw Statistics

Log-transformed Statistics

Minimum Detected	19.2	Minimum Detected	2.955
Maximum Detected	110	Maximum Detected	4.7
Mean of Detected	51.5	Mean of Detected	3.76
SD of Detected	35.81	SD of Detected	0.667
Minimum Non-Detect	14.1	Minimum Non-Detect	2.646
Maximum Non-Detect	113	Maximum Non-Detect	4.727

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect

15

Number treated as Detected

0

Single DL Non-Detect Percentage

100.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.886	Shapiro Wilk Test Statistic	0.99
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level			Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

Assuming Lognormal Distribution

DL/2 Substitution Method

DL/2 Substitution Method

Mean	25.89	Mean	2.786
SD	29.46	SD	0.94
90% DL/2 (t) UCL	36.12	90% H-Stat (DL/2) UCL	40.85

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale 2.223
		SD in Log Scale 1.196
		Mean in Original Scale 20.12
		SD in Original Scale 29.92
		90% t UCL 30.51
		90% Percentile Bootstrap UCL 30.1
		90% BCA Bootstrap UCL 34.1
		90% H-UCL 38.24

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.3
Theta Star	39.62
nu star	13
A-D Test Statistic	0.22
5% A-D Critical Value	0.683
K-S Test Statistic	0.683
5% K-S Critical Value	0.36

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	30.74
SD	24.62
SE of Mean	7.355
90% KM (t) UCL	40.63
90% KM (z) UCL	40.16
90% KM (jackknife) UCL	37.73
90% KM (bootstrap t) UCL	42.92
90% KM (BCA) UCL	58.4
90% KM (Percentile Bootstrap) UCL	46.95
90% KM (Chebyshev) UCL	52.8
95% KM (Chebyshev) UCL	62.8
97.5% KM (Chebyshev) UCL	76.67
99% KM (Chebyshev) UCL	103.9

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	1.0000E-6
Maximum	110
Mean	17.17
Median	1.0000E-6
SD	31.59
k star	0.106
Theta star	161.3
Nu star	3.194
AppChi2	0.679
90% Gamma Approximate UCL	80.75
90% Adjusted Gamma UCL	94.27

Potential UCL to Use

Recommendation Provided only
for 95% Confidence Coefficient

Note: DL/2 is not a recommended method.

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General Statistics

Number of Valid Data	15	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	3
		Percent Non-Detects	20.00%

Raw Statistics

Minimum Detected	65.3	Log-transformed Statistics	
Maximum Detected	1370	Minimum Detected	4.179
Mean of Detected	409.5	Maximum Detected	7.223
SD of Detected	375.5	Mean of Detected	5.634
Minimum Non-Detect	28.1	SD of Detected	0.939
Maximum Non-Detect	76.5	Minimum Non-Detect	3.336
		Maximum Non-Detect	4.337

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	4
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	11
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	26.67%

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.831
5% Shapiro Wilk Critical Value	0.859

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.859

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	333.2
SD	368.3
90% DL/2 (t) UCL	461.2

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	5.159
SD	1.304
90% H-Stat (DL/2) UCL	919.3

Maximum Likelihood Estimate(MLE) Method

Mean	266.4
SD	439
90% MLE (t) UCL	418.9
90% MLE (Tiku) UCL	424

Log ROS Method

Mean in Log Scale	5.223
SD in Log Scale	1.196
Mean in Original Scale	334.9
SD in Original Scale	366.9
90% t UCL	462.3
90% Percentile Bootstrap UCL	458.3
90% BCA Bootstrap UCL	486.3
90% H UCL	767.8

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

k star (bias corrected)	1.148
Theta Star	356.6
nu star	27.56

Data appear Gamma Distributed at 5% Significance Level

A-D Test Statistic

5% A-D Critical Value	0.746
K-S Test Statistic	0.746

5% K-S Critical Value	0.25
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Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	340.6
SD	349.8

Data appear Gamma Distributed at 5% Significance Level

SE of Mean	94.32
90% KM (t) UCL	467.5
90% KM (z) UCL	461.5

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

90% KM (jackknife) UCL	461.8
90% KM (bootstrap t) UCL	524.4
90% KM (BCA) UCL	456.3

Minimum	1.0000E-6
Maximum	1370
Mean	327.6
Median	193
SD	373.5

90% KM (Percentile Bootstrap) UCL	459.6
90% KM (Chebyshev) UCL	623.6
95% KM (Chebyshev) UCL	751.8
97.5% KM (Chebyshev) UCL	929.7
99% KM (Chebyshev) UCL	1279

k star	0.192
Theta star	1708
Nu star	5.753
AppChi2	2.056

97.5% KM (Chebyshev) UCL	929.7
99% KM (Chebyshev) UCL	1279
Potential UCL to Use	

90% Gamma Approximate UCL	916.6
90% Adjusted Gamma UCL	1017

Recommendation Provided only

for 95% Confidence Coefficient

Note: DL/2 is not a recommended method.